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ABSTRACT

A pilot project involved off-campus (distance education) students creating their assignments on Macintosh computers and "mailing" them electronically to a campus mainframe computer. The goal of the project was to determine what is necessary to implement and to evaluate the potential of computer communications for university-level distance education courses, specifically at the University of Saskatchewan. Some anticipated outcomes (more rapid turn-around of assignments and greater ease on the part of students in creating and editing assignments) were accomplished to varying degrees. Others (student use of specialized writing tools such as spelling checkers, and student-student electronic interaction) were not accomplished to any appreciable extent. A number of organizational and technological lessons were learned. Some had only local implications, but a number of them are generalizable to other institutions. The print-based instructional materials used by the students are included as an appendix. Also appended are the original proposal for the project, a "contract" used with regional colleges participating in the distance education network, a list of topics taught in orientation workshops for college supervisors involved in the project, and a supervisor's trouble-shooting guide. (Author/GL)

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Summary Report: Sociology 110 Distance Education Pilot Project Using Microcomputers for Communication

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Executive Summary

A pilot project involved off-campus (distance education) students creating their assignments on Macintosh microcomputers and "mailing" them electronically to a campus mainframe computer. The goal of the project was to determine what is necessary to implement, and to evaluate the potential of, computer communications for university-level distance education courses, specifically at the University of Saskatchewan.

Guiding principles in the project included the assumption that learning the course content should be primary, and learning to use the computer should be secondary; and that learning to use the computer should be accomplished in the same way (i.e., using distance education methods) as learning the content of the course. The project attempted to accomplish this at the lowest possible cost.

Some anticipated outcomes (more rapid turn-around of assignments; greater ease on the part of students in creating and editing assignments) were accomplished to varying degrees. Others (student use of specialized writing tools such as spell checkers; student-student electronic interaction) were not accomplished to any appreciable extent.

The electronic exchange of materials posed a significant number of problems; although the procedures had worked flawlessly "in the lab", their implementation "in the field" was erratic, leading to frequent frustration from the students involved. Solution of some of the problems seemed to lie in changes in the grade of phone line used and in the choice of software, but additional ones—presumed to be a result of the lengthy procedures associated with electronic submission that can only be addressed by custom software—remain.

It appears that demands on university personnel (course instructor, distance education support staff, Computing Services staff) are changed and probably increased under this method of assignment submission.

Despite the frequent submission problems encountered, most of the students valued this method of creating and submitting their assignments, and identified a number of advantages it offers over the "regular" way.

Communication costs could not be estimated with any degree of accuracy for two reasons: (a) there were only a very small number of students involved in the pilot project; (b) the numerous problems encountered often necessitated repeat attempts at submitting any given assignment. What data are available, however, indicate that telephone toll charges likely would range somewhere in the $4–9 range, per student, per assignment. (These numbers would vary, of course, in response to distance of the

student from the campus.) In addition, computer costs would likely be in the $3–4 range, per student, per assignment.

A number of valuable lessons were learned about procedures and operations which would make a full-scale implementation of electronic submission easier the next time around, but unless significant changes in staff assignment and commitment are made, the U of S is likely to be unable to implement a full-scale program. In addition, a full-scale program would involve the creation of some custom software for both microcomputers and mainframes.

A number of assignment submission strategies are identified which would cost less, but would be (in varying degrees) less effective instructionally than using the one tested in the pilot project.

A larger-scale pilot project, specifically designed to focus on instructional benefits, to assess qualitative differences in student assignments that can be attributed to the technology provided, and to determine more accurately the costs associated with electronic submission, is recommednded as a worthwhile follow-up to the ground-breaking that has been done.

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Preface

Virtually any user of computing equipment of any type will testify that few things in this world are more exciting and satisfying than having a machine execute a complex and perhaps lengthy activity quickly and efficiently, "the way it's supposed to".

Those same users will also vouch that few things in this world are more vexing and discouraging than having that same machine *not* work "the way it's supposed to", no matter whether the cause is hardware or software malfunction, the phase of the moon, or bad instructions given it by the user.

For a new user, a computer offers a mixture of pleasant anticipation and unmitigated fear. I expect that the students who participated in the pilot project described in this report experienced some of both, along with some of the excitement and satisfaction and—I'm certain—some of the vexation and discouragement felt by all users. Their tenacity in seeing the pilot project through to the end was admirable (the more so when they knew they didn't have to do so), and I extend my thanks to them on behalf of all those who learned from their tribulations. I hope their efforts will lead to worthwhile distance education environments for many other future students.

I would be less than honest if I did not admit that I went into this project with the expectation that it would succeed marvelously. The project was deliberately kept very simple, the preparation of the instructional materials was done meticulously, and I harbored no illusions about the number of things that could—and would—go wrong. And go wrong they did, on an unacceptably large number of occasions. Many times, I was thankful that the project did not involve larger numbers of students. I am still not pessimistic about using computers this way for distance education, but I am even more wary than I was about thinking it can be done easily, and with the current complement of staff and equipment devoted to this kind of activity.

There are some clear advantages to using this kind of technology for this purpose, but in order to be able to do it on any sort of scale will require the development of a much more robust infrastructure than currently exists.

I have taken the liberty of writing much of this report in the first person singular, since my initial attempt (in the third person singular) seemed stilted and artificial. Thank goodness for the search and replace capability of word processors!

E. R. M.
Saskatoon, SK
April, 1989

During the 1988–89 university year, the Part-Time Degree Studies Office of the Division of Extension and Community Relations at the University of Saskatchewan (U of S) undertook a pilot project (hereafter called the Project) in which one section of its independent study/distance education course *Sociology 110.6 — Introduction to Sociology* had students submit their assignments to the instructor electronically.

Students at remote (off-campus) sites created their written assignments on Macintosh (Mac) microcomputers, and sent them electronically to a campus mainframe computer. The instructor on campus down-loaded the assignments from the mainframe, graded and inserted teaching comments into the students' documents on his own Macintosh, them put them back on the mainframe, from which they were retrieved later by the students.

Goal of and Rationale for the Project

The overall goal of the project was to determine what is necessary to implement, and to evaluate the potential of, computer communications for university-level distance education courses while actually delivering University credit courses to distance students in the province.

Guiding Principles Underlying the Project

The vision of the future associated with this Project was one in which U of S distance education students, operating either from a community learning center, or preferably from their homes, could carry on an electronic dialogue with an instructor (or another student) in his or her home or office, via a machine which would not only assist them in creating better-quality written assignments, but would ultimately also be used for other computer-assisted instruction and computer-managed instruction activities, simulations, access to campus library services, and other learning activities.

Basic assumptions underlying the project were that learning how to use the computers

(a) should not interfere with the learning of the course content and should add minimally to the learning burden of the student; and

(b) should take place under the typical conditions associated with distance education (i.e., classes should not be required to have students learn how to use the computers, in order to use them in a learning environment that does not include classes).

The thrust of the Project was to keep it as simple and inexpensive as possible: to use the lowest-cost software available, even if it meant a little extra work for the student, and to use regular voice-grade telephone lines rather than the more expensive conditioned lines—in other words, to do things "on the cheap", insofar as was possible. When conflict occurred between the goal of simplicity of use and cost (as it did with the choice of hardware, as detailed below), simplicity of use—which can be expected to have more impact on student learning than cost—prevailed.

In line with the theme of simplicity, the Project was limited to submitting written assignments electronically for grading, using electronic mail for student-student and student-instructor dialogue, and accessing the University Library on-line catalogue. Subsequent projects could expand the range of facilities and services offered to include computer-assisted and computer-managed instruction, simulations, and on-line searching of data-bases, once the basic system was operating in a stable manner.

Anticipated Outcomes

The following benefits of electronic submission of assignments were anticipated:

- *more rapid turn-around of assignments.*

  A perennial problem associated with independent study (correspondence) courses has been the extremely slow rate of exchange of information between instructor and student. Typically, instructors have sent students packages of learning materials (texts, course notes, perhaps even audio tapes), and students have mailed in assignments. The time that elapses between a student's completing an assignment and his or her receiving feedback from the instructor is usually of the order of three weeks or more (approximately one week in the mail; a week to ten days in receipt at the Part-time Degree Studies Office, being passed to the instructor, being graded, and being returned through the Office; and approximately another week in the return mail).

  The feedback instructors are thus able to provide is virtually useless from the point of view of learning. By the time a student receives an instructor's comments, she is likely to have forgotten much of her thinking at the time of the preparation of the assignment.

- *greater ease on the part of students in creating and editing assignments.*

  Provided students have key-boarding (typing) skills, the cost of revising and editing assignments on a word processor is small. With the opportunity to

revise and re-write easily and inexpensively comes the opportunity to polish one's written work.

- *opportunity for students to use specialized writing tools (spell checkers, grammar analysis programs, thesauruses, etc.).*

  Although only one such tool (a spelling checker in the word processing program) was provided for the pilot project, it was foreseen that, if this method of submitting assignments was the way of the future, subsequent student work-stations could have available one or more writer's tools, such as grammar checkers and thesauruses, as they became available commercially at affordable prices.

- *opportunity to interact (electronically) with other students taking the course.*

  Distance education students often experience a sense of isolation, not being able to ask questions of the instructor as an on-campus student might at a class, or even being able to ask one of their fellow students. The same phenomenon—the lack of opportunity for interaction—makes it very difficult to create learning materials for use with distance education courses that actually capitalize on basic principles of teaching and learning.

  Various methods have been attempted to improve upon the feedback lag and the lack of interaction—including the use of telephone conference calls, or teleconferencing—both at the U of S and elsewhere, but no entirely satisfactory solution has been found.

  The use of computers appears to have promise for ameliorating the problems, however. It has a number of advantages:

  - written materials, such as those typically required in university courses, can easily be transferred between instructor and student, obviating the dependence upon the (slow) traditional postal system;
  - unlike with telephones, scheduled meeting times do not have to be observed: either party can send a message to another at any time, whether or not the second party is in a given location at that time, and replies can be dealt with the same way;
  - students at different locations can communicate with one another as readily as they can with the instructor, permitting the student-student interchange that is so desirable but so hard to accomplish in a distance education setting.

Together, it was hoped, these factors would lead to both better quality work from the students, and greater student satisfaction.

History of the Project

The Project was slow in getting started; it actually began in December, 1985, with an application for funding support to the Campus-Wide Investment Program (CWIP) that the University of Saskatchewan undertook in cooperation with Digital Equipment Canada (DEC) and the University Renewal and Development Fund (URDF) established by the Government of Saskatchewan (see Appendix A).

Under that application, the project was to use as-yet-unannounced technology from DEC (which eventually became the VAXmate) to provide word processing power, the capability for instructors and students to exchange assignment documents electronically and to use electronic mail, some small amounts of computer-assisted instruction (CAI), and videotex in North American Presentation Level Protocol Standard (NAPLPS). (At that time, the Telidon industry in Canada was on the verge of taking a large step forward. Of course, with hindsight, we know that step was not taken.)

The initial Project schedule called for the pilot phase to be conducted with a few students in 1987–88, with an evaluation of a full-scale class conducted in 1988–89. Sask Tel (the Saskatchewan telephone company) had a NAPLPS Telidon service, Agritex, which was to be the carrier. Although the Project was approved for funding quite early in the CWIP program (early 1986), essentially nothing happened for nearly a year, due to the repeated postponement of the availability of the VAXmate.

When the VAXmate did appear, it was clear that the technology was not the one needed for the Project. First, it lacked sufficient floppy disk capacity to make it a viable stand-alone machine for convenient, easy-to-use word processing, as the Project required; the VAXmate was designed to be less a stand-alone microcomputer than a sophisticated work-station which relied heavily on easy access to mainframe computing power. Second, it was relatively expensive, as MS-DOS machines go; it was difficult to foresee the wide-spread use of the VAXmate in community colleges when less expensive competitors could do the same job, perhaps better. Third, it did not support NAPLPS. As it turned out, CAI was not really viable, either, because DEC's courseware authoring product was relatively clumsy and archaic.

About the time these facts were becoming known, the Division of Extension and Community Relations (DECR) at the U of S began using Macintoshes for the preparation of print materials, particularly their distance education course materials. On the Mac,

graphics were easy to integrate with text, various fonts were available both on-screen and in printed form, and the system was exceptionally easy to learn to use (a point very much in favor of the Mac, since learning how to use the computer was secondary to the learning of the subject-matter of the distance education course)[1]. It quickly became clear that the Macintosh was the preferred technology for the Project, and DECR withdrew the Project from CWIP and approached the URDF project management team with the proposal to switch technologies. The proposed change was accepted, and Macintosh products were substituted for the VAXmates. (By this time, it was increasingly evident that NAPLPS was not going to have a major impact on either education or other domains of information-provision, and Agritex was more or less floundering. DECR instructional designers felt that the superior graphics of the Macintosh would more than make up for the lack of NAPLPS capability, however. CAI was not then possible with the Mac, so that capability had to be sacrificed. Today, of course, CAI is possible on the Mac.)

The necessary equipment was acquired during the 1987–88 term, with the pilot phase scheduled for 1988–89. A student manual was written. Pilot sites were determined, and the special sections of the Sociology 110.6 course participating in the Project were advertised in the U of S *Evening, Independent Studies, Televised Instruction, and Off-Campus Calendar*. The course was simultaneously offered in the traditional Canada Post-based format.

Several regional colleges were contacted to determine their interest in participating in the Project; eventually, four colleges wanted to participate, but due to the limited amount of hardware available to the project, the Project had to be restricted to four sites (Unity, Tisdale, Muenster, and Saskatoon). In both Unity and Tisdale, the regional colleges (North West Regional College, and Cumberland Regional College, respectively) were involved in setting up work-sites for students. In Muenster, St. Peter's College was set up as a site, but eventually failed to attract any students. Since there were only two students in Saskatoon, and one already had all necessary equipment except a modem, the decision was made to provide suitable equipment in the homes of the Saskatoon students rather than involve the Saskatchewan Institute of Applied Science and Technology (SIAST), Kelsey Campus, as was originally intended.

Five students participated in the Project: two in Tisdale, one in Unity, and two in Saskatoon. One of the Saskatoon students dropped the course just before Christmas, for reasons she said were unrelated to the course and the Project.

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[1] This intuitive observation was subsequently confirmed in more formal studies (e.g., Peat, Marwick, Main & Co., 1987; Diagnostic Research, Inc., ca. 1988) showing the importance of the "ease of learning" and "ease of use" factors.

Hardware and Software Used

Each site was equipped, at the Project's expense, with the following hardware:

- *two Macintosh Plus microcomputers, each with external (800K) drives and cooling fans.*

  Each Mac Plus had one megabyte of RAM. The one megabyte, dual 800K drive configuration provided more than enough processing power to get the necessary job done. As noted, the choice of the Mac over its competitors was based almost completely on its apparent characteristic of being easy to learn to use. Students taking the course, we thought, ought to have a minimal additional learning burden placed on them by learning how to use the computer. More formal studies (see footnote 1) have subsequently established that the Mac user interface is in fact much more readily learned than competing brands', although the initial purchase prices of the latter are almost invariably lower.

- *one ImageWriter II printer, connected to one Mac Plus.*

  Although, strictly speaking, printed assignments were not required in the course, it was expected that students would want to keep hard copies of their assignments. Too, the printer acted as a safety valve: In case something went very wrong with the electronic submission system, the hard copy could always be mailed in the traditional way.

- *one Apple Personal Modem (1200 baud), connected to the other Mac Plus.*

  Price considerations put higher-speed modems out of the question; in any case, the University mainframe's reception modems were limited to 1200 baud. Although it is possible to have both a modem and a printer attached to a single machine, each Mac Plus was kept as a single function machine (print or electronic mail) to keep things simpler for the student.

Each site had the following software:

- *two copies of* Introduction to Macintosh Plus.

  This introductory computer-based instruction sequence is provided by Apple with every Mac Plus sold. It provides an overview of some of the more basic functions of the Mac. Using this software was optional, since virtually all of

the information it gave was also available in print form in the *Macintosh Plus* manual.

- *two copies of WriteNow (a word processor).*

  WriteNow was chosen from among the word processors available for the Mac because, at the time of selection, it offered a combination of the most versatility and word processing power, was the easiest to learn to use, and had the lowest price. Of these criteria, the ease of learning probably had the greatest influence on the decision.

- *one copy of Binhex 5.0.*

  Binhex is a low-cost shareware program that compacts files and converts them to either ASCII characters (Binhex 4.0) or MacBinary representation (Binhex 5.0) for transportation over telephone lines. WriteNow documents had to be "packaged" with Binhex in order for fonts and formatting information to transport correctly. (Although WriteNow does permit conversion of documents to ASCII files, it was felt that the extra step of conversion to ASCII was roughly equivalent to running the Binhex program, and the latter retains font and format information which is lost when the document is converted to ASCII characters.) As will be explained later in this report, Binhex 5.0 was eventually downgraded to Binhex 4.0.

- *one copy of Kermit.*

  Kermit is a public domain telecommunications program, available from Columbia University, that is commonly used at universities. It is available in versions for many types of machines; hence Kermit was used on the Macs to communicate with a different version of Kermit running on the University mainframe, two DECnetted VAXen running the VMS operating system.

Print Materials Used

Each site also had the following print materials:

- *two* Macintosh Plus *manuals (provided by Apple with each Mac Plus).*

  This manual provides a first-time user with sufficient instruction to operate the Mac.

- *two* WriteNow *manuals (provided with WriteNow software).*

  This manual assumes knowledge of the content of the *Macintosh Plus* manual, and provides instruction on the use of the word processor, WriteNow. Certain sections of the WriteNow manual, which pertained to software versions or equipment configurations other than those used were "deleted" by crossing them out with see-through felt marker, so that students would not be distracted or confused by them.

In addition to the regular course materials provided to independent study students (a course guide, a set of readings, and textbooks purchased by the student), each student in the Project was given a copy of a manual entitled *Orientation to Using a Microcomputer As a Distance Education Communication Tool (Please Read Me First)*, and two blank floppy disks. The contents of the *Orientation* document are detailed in Appendix B.

A dozen years of experience in instructional design and considerable experience with both the Macintosh and the campus mainframe was brought to bear on the *Orientation* document. I was determined that if the project did not succeed, it would not be the fault of the instructional materials. All procedures described in the materials had been tested and re-tested a number of times over a considerable period, using exactly the same equipment that the students would use, and public telephone lines. As well as testing the materials myself by deliberately trying to mis-interpret them or respond incorrectly, I pilot tested and fine-tuned them individually with two people who had backgrounds comparable to those expected in the students (i.e., no experience with the Mac or with other computers).

Physical Facilities

Each college site was requested to provide space and facilities to house the equipment, for which guidelines were provided in the "contract" specifying roles and responsibilities (see Appendix C). It was explained that the guidelines were just that, rather than strict requirements, and the colleges came as close as they reasonably could to meeting them. The colleges provided separate telephone lines for use in the Project.

Human Resource Infrastructure

As part of the agreement with regional colleges (see Appendix C), the Project requested two individuals per site who could be trained to act as supervisors and low-level

technical trouble-shooters who could help students if things didn't go the way they were supposed to. These individuals were deemed crucial to the project; students just learning a new technology had to have someone to turn to when the inevitable happened and the system didn't work as it was supposed to. Experience with computers in as complex a system relationship as was to be used in the Project indicated that little things would inevitably go wrong. Although perhaps 99% of the possible problems could be foreseen and instruction on their solution provided, the remaining 1% could make or break the Project. If students' problems could not be solved within a reasonable length of time, it was expected, they would simply give up in frustration, and perhaps drop the course as a result (or at minimum, retreat to submitting their assignments in the more traditional method, a choice that was always open to them).

It was explicitly emphasized to the supervisors that they were not to teach or show students how to use the equipment and software; they were to permit the self-instructional materials provided with the course to fulfill that function. Rather, they were merely to act as a source of somewhat greater sophistication than the students vis-à-vis hardware and software use. Students were also informed of the expectation that they would learn on their own, and turn to the supervisors only when absolutely necessary.

I gave the supervisors a two-day workshop as an introduction to the hardware and software, in early summer before the Project was underway. An outline of the topics covered in the workshop is in Appendix D.

Most of the supervisors had not used a computer of any kind before, and none had used a Mac. The instruction in the workshop consisted mostly of having them use the same self-instructional materials that the students would use, along with hands-on experience. This was done for the dual purpose of having them learn how to use the Mac and to "put them into the shoes" of the students who would be expected to learn on their own from the self-instructional materials and from one another.

Almost all the supervisors reported feeling quite comfortable with using the hardware and software before the end of the two-day workshop. Those that were still uneasy were encouraged to try using the equipment as soon as it was installed at their sites (within a couple of weeks). Most did, and felt relatively comfortable with the equipment by early fall, when the students began working with it.

A second level of human infrastructure was in the Part-Time Degree Studies Office. Secretarial support for the traditional mail-based courses was used relatively little for the Project, beyond mailing out the learning materials package initially. However, I remained available as a technical trouble-shooter for the duration of the project, a role which eventually consumed a good deal of time.

Another level of human infrastructure was the staff of Computing Services, who acted as consultants and trouble-shooters when problems cropped up could that I could not solve.

Finally, the individual who acted as "instructor" (i.e., marker of assignments) for the course acted in the same role both for students in the Project and for students taking the same course by the traditional method. This individual had been in that role several times in previous years, and worked under the guidance of the second investigator in the Project, Dr. John Thompson. Dr. Thompson's interest in improving the writing skills of students in the context of teaching sociology caused him to be involved in the initial planning of the project and in ensuring that the marking of assignments ran smoothly.

Feedback From Students

The students who completed the course were interviewed by telephone near the end of the course. A loosely structured interview format was used to probe certain aspects of their experience in the pilot project. Their responses are summarized below.

Three of the students identified the content (i.e., sociology) as being the best thing about the course; one identified the accessibility of the instructor through electronic mail as the best thing.

The worst thing about the course, according to two students, was the mail-in procedure, especially as it was before Christmas (i.e., before the hardware and software changes were made). One student thought that the course content (which she identified as the best thing about the course) was also the worst, in the sense that some of the things she learned were very unsettling to her. The other student felt that the course load was very heavy, and the relative inaccessibility of the Mac and erratic performance of the mail-in procedure were the worst things about the course.

Two students had had no previous experience with a computer. One had created several fairly lengthy documents on a Macintosh previously; the other had had a fair amount of experience on a PC-DOS machine, which had taken her three or four months to feel confident in operating.

The students who had had no previous experience reported that learning to create, edit, and save a document on the Mac to a reasonable comfort level took them approximately 12–16 hours. The student who had previous PC-DOS experience reported it took her only three to four hours.

The mail-in procedure was sufficiently complicated and erratic in performance that a couple of students reported still not feeling very comfortable with it, even at the end of the course.

Generally, both the *Macintosh Plus* and *WriteNow* manuals were regarded as quite good, and had no areas in them that were problematic or difficult to understand, according to the students.

While one of the students thought that learning to use the Macs was not time well spent (it made more work than it was worth, she said; perhaps it should be noted that this student knew how to use PC-DOS word processors), the others thought it was worthwhile to learn how to use a word processing program. Indeed, two of them said they took the course largely because they wanted to learn to use a word processor. They reported that the use of a word processor for preparing assignments was much better than the alternatives (e.g., using a typewriter).

The amount of editing and re-writing done varied from student to student, and generally appeared to increase over the duration of the course. Even at the end, however, all student reported writing out their assignments at home, then entering them into the computer for transmission, rather than actually composing at the keyboard. Most of the editing done at the Mac was to correct typographical errors, and make similar small changes. More extensive use of the editing capabilities was made for the major assignment (near the end of the class), with two students reporting going through several drafts, printing out copies in between.

Although one student did not use the spelling checker included in WriteNow, the other three did use it a couple of times.

Two of the students never tried to access the University Library catalogue, but the other two did two or three times. When they did try, they had no problems using it, except for remembering the arcane commands employed.

Students did not use electronic mail to communicate with one another. Although one student did e-mail a note to the others, inviting interaction, early in the course, she got no replies.

One student reported frequent problems with establishing communications with the mainframe, even after the hardware and software changes were made. The other three reported that the change-over cleared up most of their problems in this area.

On the question of whether this method of submitting assignments is preferable over the regular mail system, one student said she did prefer using the Mac, because she had bad handwriting and no typewriter. She was now relatively comfortable with using the

computer (which was one of the major reasons she took the course), if not necessarily with mailing in assignments. A second student said she did not prefer the Mac method, but perhaps she might, if it worked properly. A third student said that it was "super", now that it was working properly. She liked the way the instructor's comments fit into her assignments with this method. She thought that it wouldn't be as effective if he wrote in the margins on her paper. She liked the fact that she could easily read his comments, no matter what his handwriting was like. The fourth student said she much preferred the Mac method, as long as it worked properly.

None of the students had taken a "regular" correspondence course before from a university, although two had taken one in high school.

On the question of turn-around time of assignments, two students indicated they were satisfied with the turn-around time they experienced, while the other two thought it could have been faster. One volunteered that she probably would have been more satisfied than she was in this regard, had she been led to expect slower turn-around. As it was, the materials had more or less promised two or three day turn-around, so that was what she expected.

Two students said they would take another course which used the Mac for communication; a third said it would depend on her personal schedule; the fourth said she would not, because it takes longer to do her work this way.

Three students would advise a friend to take a course that used the Mac for communication, while the fourth would not.

One student said she would take a "regular" correspondence course, two said they would only if they had access to a word processor (or at minimum, a typewriter), and one said it would depend on her personal schedule.

Communication Costs

One of the hoped-for outcomes of the Project was the development of some feeling for what a full-scale implementation of electronic assignment submission might cost. Unfortunately, the number of students who decided to enrol in the section of the course involved in the Project was too small to give more than a very rough idea of what the per student and per assignment costs might be for a full-scale venture. Also, the "de-bugging" of the system probably inflated costs somewhat, since more attempts were made to submit assignments than might have been necessary if everything worked properly. Finally, the Sociology course itself is somewhat atypical of the distance education courses offered by the PTDS Office at the U of S, in that it has a large number

of relatively small (short) assignments, whereas most courses have fewer, longer assignments.[2] Although per student, per assignment costs are not affected by this fact, the overall Project costs are. Still, it is instructive to examine the mainframe computing and telephone costs incurred in the Project. The data below represent the costs associated with servicing three students (the other student who completed the course did not use long distance calls).

Telephone Costs

The telephone costs incurred by the Project were $2448 up till and including the March Sask Tel billing. This amount included $950 which represented fixed costs like monthly rental fees and taxes, long distance calls required for trouble-shooting, and a one-time cost for converting one site from voice-grade line to data-grade. Thus the actual long-distance tolls amounted to $1498, for a total of 377 calls for attempted transmission of assignments during the period September–March.

One-third (33%) of those calls were under three minutes in duration, according to billing records. Since it is unlikely that any useful work can be accomplished (in addition to logging on) during that brief a time, it can be assumed that these represent failed logons or other trouble. The cost of these calls was $84.

It is not possible to reconstruct exactly how many calls were associated with each assignment. However, it is possible to make some rough estimates based on the assumption that several calls during the same or adjacent hours of a given day were probably related to sending in the same assignment. Thus the remainder of the analysis deals with the number of calls per day.

Over the September–March period, the number of calls per day ranged from 1–11; the average was 3.7 . The number of times that each number of calls were made per day are represented in Figure 1. Most days (61% of them), three or fewer calls were made.

Both prior to and after the phone line and software change, the number of calls per day ranged from 1–11. The pre-change average was 4.3, while the post-change average was 3.1 (see Figure 2). Prior to the change, 54% of the days had three or fewer calls, while after the change, 70% had three or fewer. This substantiates the subjective observation that there fewer problems after the change. Still, even after the change, more than half

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[2] Whereas six-credit PTDS independent study courses typically have about 10 assignments, the Sociology course has 22, ranging in length from about 2–16 pages, plus a final essay.

the days (57%) had two or more calls, indicating that the transfer process was still not entirely trouble-free.

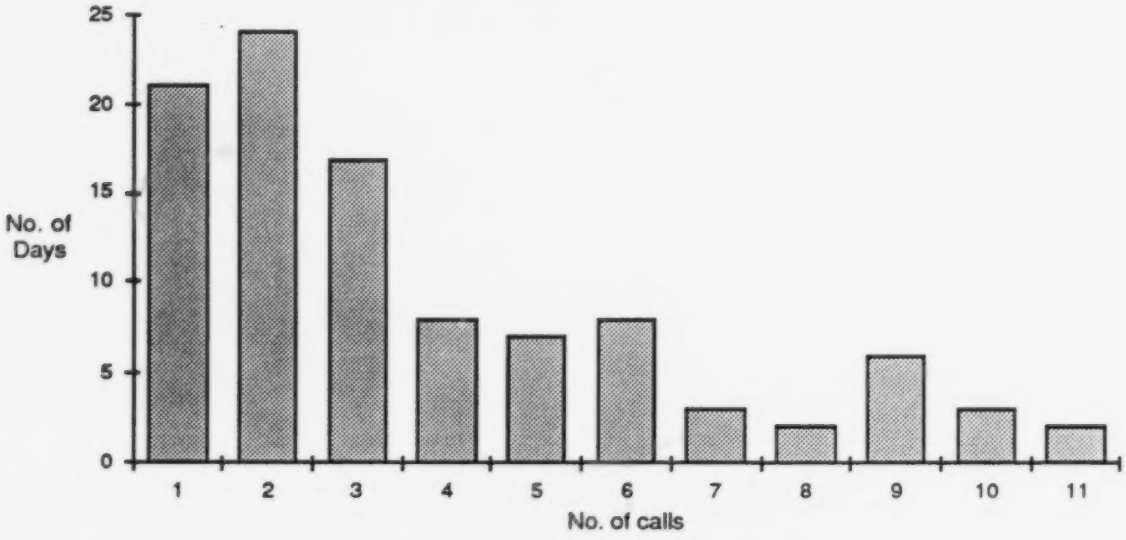

Figure 1. Frequency with which multiple calls per day were placed.

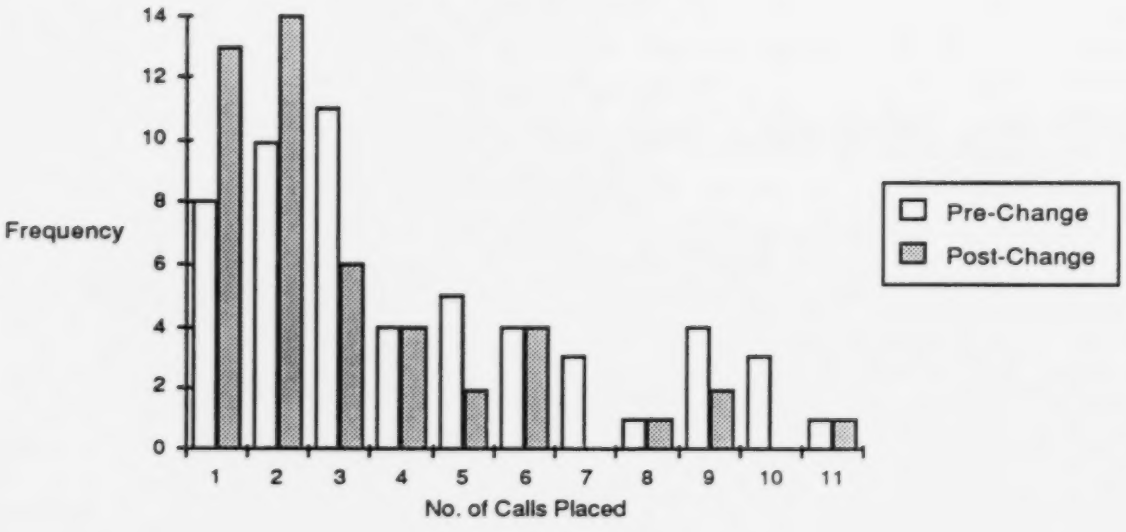

Figure 2. Frequency with which multiple calls per day were placed before and after hardware and software changes.

Over the September–March period, the calls ranged in length (per day) from the minimum billing of one minute to 154 minutes, with an average length of 30.6 minutes. The cost per day ranged from $0.50 to $80.08 across the two long-distance sites, and averaged $14.84 . The cost per day is an underestimation of the cost per assignment, since calls were made on 101 days to send in a maximum of 66 assignments, not all of which, we know, were actually submitted during the billing period analyzed.

Before the change, calls ranged in length from 3–154 minutes per day, with an average of 32.1 minutes. After the change, calls ranged from 1–145 minutes per day, with an average of 28.9 minutes. This indicates that although the frustration due to failed logons and other problems might have been reduced by the change in hardware and software, the actual duration of transmission time (and hence the overall cost) did not change markedly as a result of the change. The cost per day before the change ranged from $1.50–$80.08, with an average of $15.63, whereas the cost per day after the change ranged from $0.50–$75.40, with an average of $13.92 .

Although some calls were made at evening rates, the daytime hours were the most popular, at least for this small group of students. Frequency and times of calls are represented in the graph in Figure 3.

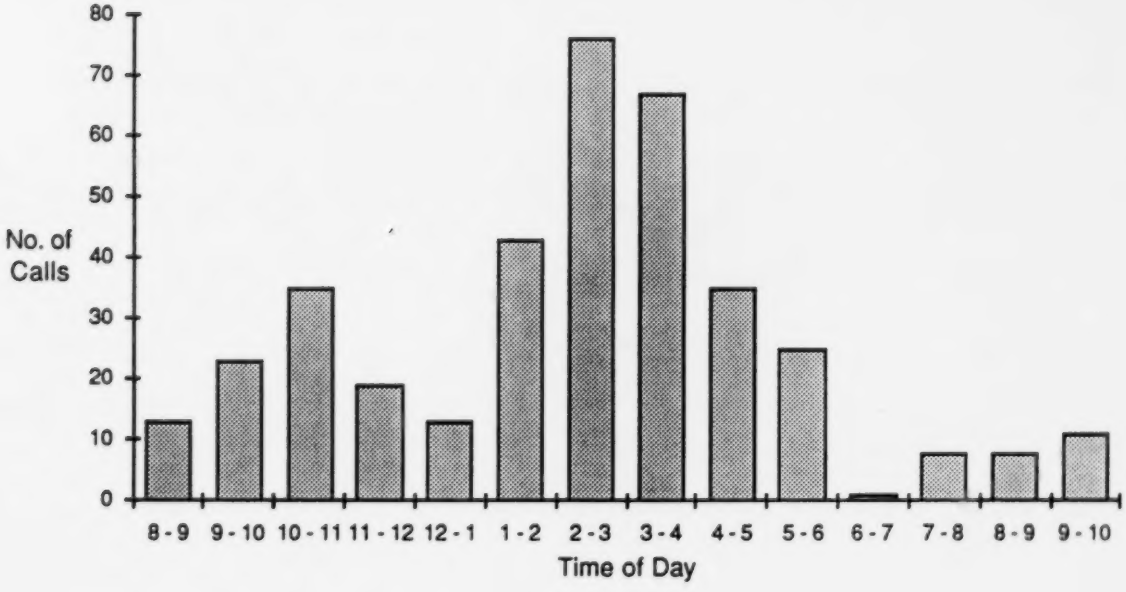

Figure 3. Frequency of calls at various hours of the day.

Under the most optimistic set of assumptions (that the change in hardware and software represented a permanent improvement in the capability of submitting assignments; that the decreased length of calls per day and number of calls required to submit an assignment was the result of the change, and not of students' learning to cope with the system; and that each day's efforts represents one assignment—which we know to be an overestimation, explained above), the cost of telephone calls per student per assignment would appear to be about $4.65 . Realistically, it is probably closer to twice that amount.

It should be remembered that the telephone toll charges are distance-sensitive. As guidance in interpreting these cost data, Unity is approximately 191 km. (119 mi.) from the campus, and Tisdale is 266 km. (165) miles. Day-rate toll charges to the two communities are $0.50 and $0.52, respectively, and evening-rate charges are $0.33 and $0.34.

Computer Costs

Records on mainframe computer use were analyzed for each student and for the instructor. The time span covered by these records is September 1—April 12. That is, as in the case of telephone charges, these records do not cover the cost of the entire course, just most of it.

Students spent an average of 17 hours and 38 minutes connected to the mainframe, and used an average of 6 minutes and 15 seconds of CPU time. The charges associated with these services averaged $38.24. The instructor's corresponding times and costs are shown in Table 1.

Taking the instructor's computer time as "overhead" to serving the students, the average cost per student for computer time was $78.94. Computer time for trouble-shooting problems associated with the Project could not be separated from my other uses of the computer, hence are not calculated into the figure of $78.94. Using the assumption of 22 assignments (knowing that it is an overly conservative one), the cost per student per assignment for computer usage is therefore $3.59 .

Table 1. Computer Costs for Students and Instructor

	Connect Time (hrs:min)	CPU Time (min:sec)	Charge ($)
Instructor	97:16	35:55	162.83
Student1	29:41	10:12	66.66
Student2	10:56	4:32	22.87
Student3	22:13	8:17	46.17
Student4	8:24	1:57	17.24

Problems Encountered and Lessons Learned

During the first several months of operation, a number of problems were encountered, and a number of lessons were learned. The problems which were encountered are listed below, in no particular order, except that the first two probably accounted for more time expended in detective work than all others:

- *Voice-grade telephone lines were inadequate to the task.*

  One particular site had innumerable difficulties with students' files frequently arriving mangled and unreadable by the appropriate software; other sites had similar problems only occasionally. With the number of variables involved, it proved very difficult to trace the origin of the problem: The Mac, WriteNow, Binhex, Kermit, the modem, telephone lines from student site to mainframe, the student possibly not following lengthy and complex procedures precisely, mainframe reception through a complex campus network, the "harvesting" of files from the students' mainframe accounts to the instructor's mainframe account, the instructor possibly not following procedures, telephone lines from the mainframe to the instructor's home, his modem, another copy of each of Kermit, Binhex, and WriteNow—each item, alone and in combination, offered a possible explanation.

  It took literally months before two consecutive weeks went by without a problem with a mangled file. Along the way, the voice grade phone line to the most problematic site was replaced with a data-grade line, and Binhex 5.0 was replaced with Binhex 4.0. In addition, the use of the equipment on campus that formed the interface between the campus system and the student was also changed. It is still not clear which factor was the most important in clearing

up the problems, but the frustration experienced by the students up to this point made it imprudent to attempt to find out by trial and error.

At some sites, students learned to vary the times of day (and indeed, the days of the week) at which they attempted to transfer files, with some success. Still, there wasn't sufficient predictability to warrant dependence on voice-grade lines.

(Part of the difficulty in chasing down the problems was that they were intermittent; students doing the same thing from the same site at different times would get different results. They also usually defied replication in the sense that when I tried exactly the same procedures as the student had, but from a different location, I was unable to get the results they got. This, of course, pointed to the telephone lines; however, I was also using normal voice-grade lines in my unsuccessful attempts to replicate the problems.)

- *Binhex 4.0 worked more reliably than Binhex 5.0.*

  As implied above, at a certain point both Binhex and Kermit received considerable scrutiny. Both had been around for quite some time, had been widely and reliably used in the Macintosh community, and were virtually above suspicion; indeed, those were among the major reasons they had been selected for use in the Project. (Low cost was the other reason.) A turning point occurred when first a student, then I, and finally Computing Services staff were unable to successfully upload and download a Binhexed (v. 5.0) WriteNow document that for all intents and purposes appeared normal, after having done so dozens of times with different documents. Binhex 4.0, on the other hand, worked well for that document. Here was a case when a software *down*grade improved matters.

  We are still not sure whether it was the change in output (from ASCII from Binhex 4.0 to MacBinary from Binhex 5.0) *per se*, or some interaction between Binhex 5.0 and WriteNow's formatting codes that caused the problem.

- *Operating procedures cannot be changed in this kind of environment without adequate warning.*

  Two incidents illustrated that change wreaks havoc on novice computer users, particularly when they are part-time, distance education students.

  In the first, the instructor changed the "rules" for naming files submitted by the students. Although he posted his revised rules on electronic mail sent to the students, that turned out not to be enough warning. Students began

phoning me, wondering why they couldn't find the files they expected. I couldn't tell them, because nobody had told *me* the new rules.

A second incident involved Computing Services' changing the logon procedure; this was done "out of the blue", despite verbal assurances to the contrary elicited before the Project started (in an attempt to forestall just such an eventuality). One day, the new logon procedure was in place. The only notice given had been electronic mail which was posted one working day before the change was implemented. Students phoned me when they couldn't log on according to the instructions I'd written; all I could tell them was that neither could I! Furthermore, the only existing explication of the new logon instructions was on the mainframe electronic mail system, which couldn't be read until one was logged on.

- *Instructors must be willing to operate under the shortened turn-around time.*

  In the first few weeks of the Project, the expectations of more rapid turn-around were not being met by the instructor, who had approached the situation with the intent of logging on only once per week to collect incoming assignments and to return graded ones. Of course both the students and the principal investigators in the Project were not satisfied with that arrangement, and the latter took action to change it.

  Throughout the course, it was clear that students *expected* very rapid turn-around (as they had been promised). If the instructor had to be away for a few days, causing assignments not to be returned within three or four days, students would send queries about their un-returned assignments via electronic mail; if that brought no immediate response, they used the phone. (In retrospect, it should have been communicated to students that a wait of three or four days was not to be considered inordinate.)

- *The processes currently required of students to submit assignments electronically are obtrusive and unnecessarily complex.*

  The sequence of activities required for a student to prepare and submit an assignment electronically was known to be complex and protracted. To counter this, great care was taken to provide a minutely detailed, step-by-step description of what had to be done (in the *Orientation* document). There is some evidence that despite this, some students still experienced confusion when submitting their assignments, even toward the end of the course.

  Students first created a WriteNow document. Then they ran Binhex, to "package" the document for travel. In the course of running Binhex, they had

to rename the ensuing document in order *(a)* to differentiate it from the original WriteNow document, and *(b)* to conform to the requirements of a mainframe program, CLASS_COLLECT, which was used to "harvest" the assignments from various student accounts and put them into the instructor's account. Finally, they had to run Kermit, log on to the mainframe, and upload the Binhexed file. To download the graded assignments required the same procedure, in reverse. Of course, the instructor had to do the same things to get the assignments off the mainframe and onto his Mac. Finally, the whole sequence had to be repeated when the assignments were returned to the students.

The renaming certainly created problems. It was evident that on a number of occasions, students got confused and sent the wrong (un-Binhexed) files, which, of course, did not transport properly and would not open when received.

At the other end, the instructor had to spend more time than he normally would collecting and downloading (and uploading) student files. That is, in the traditional setting, he would simply have to pick up a batch of student papers from the Part-Time Degree Studies Office; in this environment, he had to log on to the mainframe and initiate a fairly lengthy downloading (or uploading) procedure. Once again, the re-naming of files intruded. Although the instructor managed to automate the procedure somewhat, it was still unwieldy and wasteful of his time.

Along the way, students were treated to far more arcane error messages than they should have had to endure. Students should not be expected to be able to interpret a message such as

```
% Kermit-32 - E - RNS32, ACP file extend failed for A3.N
```

when all that is intended is to notify the student that her work-space is full.

At minimum, what is needed to address this problem is a single custom program that would do it all with one click of the mouse. Given a program with a properly designed Macintosh interface, it should be possible for a student to enter only her name and the name of the assignment, and have the program do all the rest: Binhexing (or equivalent), logging on, uploading the file, and logging off. No such program exists, to our knowledge, but were the University to write one, it should have considerable commercial potential, given the current emphasis on integration between VAXen and Macintosh.

At the present time, instructors have to know a considerable amount of the VAX operating system language, VMS, in order to be able to cope with some of the tribulations that occur. Since a good many instructors of our distance education courses do not know VMS, and are probably not very strongly motivated to learn, the only other solution is for better-developed human infrastructure from either Computing Services or the Part-Time Degree Studies Office just to support existing procedures for submission and return of assignments. That is not likely to occur in the foreseeable future because of the shortage of human resources available to both.

- *Considerable human resources from Computing Services would have to be made available for this form of distance education to be viable on more than a pilot project basis.*

  Although the staff members of the systems group were very helpful in attacking problems encountered in the Project, it happened several times that the appropriate help could not be obtained in a timely manner because systems programmers were involved in other responsibilities.

  Simply put, the infrastructure is spread too thin to be able to cope with a full implementation of this method of distance education delivery. In part, this relates to the last point of solving a number of problems associated with electronic submission by having custom software written—it is unlikely to be possible with the current human resources available from Computing Services.

- *Reliability of campus mainframe service must be increased.*

  Although Computing Services' statistics will undoubtedly show good up-time percentages for the two VAXen used as assignment drops, in fact they were virtually unavailable many times. It is merely quite frustrating to wait through a protracted logon sequence when one is on campus, using 9600 baud lines. When one is phoning long distance (regardless of who is paying the charges, the student or the University) at 1200 baud, the long waiting times that are frequently encountered when logging on to SKYRUS and SKYWAY are completely off-putting. Not knowing exactly what is going on, wondering whether it is something that they have done that is causing the delay, novice users will frequently just give up trying. Trying again later is not a great inconvenience when one is doing so from one's office, but when a student has travelled across town to a Regional College office (or perhaps many miles, if the student lives on a farm or in another community), trying again can be indeed quite trying (bad pun intended).

Whether the solution to this problem lies in larger mainframe capacity devoted to general time-shared use on campus, or in a VAX devoted expressly to the purpose of acting as a way-station for student assignments, something has to be done before the University can consider undertaking this distance education service on a full-scale basis.

- *Monitoring the flow of assignments is important.*

  Even given the full cooperation of instructors in achieving rapid turn-around, the Part-Time Degree Studies (PTDS) Office will probably need to monitor the inflow and outflow of assignments, checking on the regular submission from students and the timely return of graded assignments (as it does so for paper-based assignments). Without some custom programming on the VAX, it would be almost impossible to do the same with electronic assignments. Furthermore, therein lies a dilemma: To have the PTDS Office act as a flow coordinator of electronic assignments would not work very well, either; it would simply be step in the wrong direction in terms of the goal of having direct and easy communication flowing between the instructor and the student (regardless of where each is located).

Summary of Outcomes

More rapid turn-around of assignments was indeed achieved under the Project. However, two observations apply:

(a) It is not entirely clear which of two factors resulted in quicker turn-around. On the one hand, the speed with which assignments arrived on campus was unquestionably faster than with Canada Post, despite the fact that often, multiple delays caused by system problems occurred in assignment transmission. On the other hand, the instructor reported feeling constant pressure to respond quickly. He felt obligated to check the mainframe daily, and even felt almost guilty when he had to travel one weekend. These are considerations that would simply not apply if he were picking up papers at the PTDS office for grading.

(b) According to the information gleaned from students through the telephone interviews, some students were still not entirely satisfied with the turn-around time. Perhaps this dissatisfaction was simply the result of an unrealistic expectation that turn-around would be extremely fast (much faster than one might expect in an on-campus course, for example). It seems clear that the use of electronic assignment submission creates an imperative quite different than the "regular" distance education course does.

Generally, there does seem to be greater ease for students in creating and editing assignments. They valued access to word processing. The amount of re-writing and editing they did does not seem to be particularly high; perhaps if it is to be an objective of a course that writing skills improve, more direct and explicit instruction in that domain needs to be done.

In a similar vein, if the amount of use of the spelling checker is any indication, the accomplishment of a course objective dealing specifically with the improvement of writing skills through the use of specialized writing tools such as grammar checkers or thesauruses will likely require more direct instruction than was provided in the Project.

The opportunity for electronic interaction between students in the course was not taken up. Students seemed to ignore each others' existence, just as they seem to have done in previous PTDS experience, with other forms of student-student communication such as telephone. One student attempted early in the course to make contact with the others, but did not elicit any appreciable interaction.

However, electronic student-instructor interaction may be a different matter. With such a small number of students participating in the pilot project, it is difficult to separate personal characteristics of the students from system characteristics. Nevertheless, it is worthwhile noting that one student felt quite strongly that the chief benefit of the Project was the ability to send messages to the instructor and to receive his responses. She did not send regular e-mail messages, but rather tacked her comments and questions about a previous assignment onto an assignment she was currently submitting. The instructor would respond to her comments and questions as part of his feedback for the assignment. She felt that this accessibility to the instructor was the key benefit afforded by the Project. It was different—and better—than telephoning him (aside from the obvious problems of "telephone tag"), in the sense that she could compose her thoughts and arguments more carefully when she put them in writing. Too, she could read and re-read his responses, and reflect on them, rather than depend on her recollection of a telephone conversation.

Examination of the instructor's e-mail file after the completion of the project showed that the vast majority of electronic mail exchanges dealt with administrative rather than substantive issues. Only a few exchanges between the instructor and students involved questions of sociology. The rest carried messages whose gist was "Your last assignment did not arrive in readable form; please re-submit it."

One of the benefits of electronic mail exchanges between students and instructor was independence from time constraints. Logon records indicate that many of the instructor's logons were after midnight and into the early morning hours (when a

phone call, for example, would be considered out of the question). For some people, this freedom to choose when to collect assignments and respond to student questions might be of considerable value.

At least one of the basic assumptions underlying the Project—that computers should not interfere with the learning of the course content and should add minimally to the learning burden of the student—seems to have been appropriate. Students valued their learning of how to use a word processor, and most of them thought the time spent in that learning was worthwhile. However, there is a limit on the number of problems with the system which can be coped with, beyond which the technology interferes with learning the content of the course. One student expressed this by saying that she didn't think the effort involved in using electronic submission was worth the extra time and effort it demanded. Another student put it succinctly in an e-mail message to the instructor: "It's hard to concentrate on sociology when the machines don't work right."

Both the comments of students interviewed, and more formal studies done elsewhere (see footnote 1) show that the Macintosh was probably the appropriate choice of hardware. The choice of word processing software also seems to have been appropriate.

The attempt to do things "on the cheap", however, may have been less appropriate, particularly as it translated into the need for students to go through numerous steps to get their assignment submitted.

With respect to telephone lines, it seems that "better safe than sorry" might be an appropriate strategy. The amount of money saved by trying to use voice-grade lines rather than data-grade lines was inconsequential in comparison to the amount of time and energy expended on solving the problems that appear to be related, at least in part, to the substitution.

The vision of the future, of student-instructor and student-student interaction through electronic means, remains futuristic and elusive. The method tested in the Project does little to address the problem of the one student who had to drive many miles just to gain access to the Mac. However, an extension of the Project (a Mac in her home) *would* address the problem. Whether or not other machine types (which, while generally less expensive, are more difficult to learn how to use) could or should be integrated with Macintoshes is an avenue unexplored by the Project, one that is likely to have many rocky stretches.

One thing does seem to be clear as a result of the Project: The U of S is not now equipped to offer students the opportunity to submit their distance education assignments electronically on anything approaching a full-scale basis. If the University seriously wants to pursue the use of electronic assignment submission, it must face the problems

encountered in the Project head-on, and devote the necessary resources to solving them. If it wants to lead in the development of this aspect of distance education in the Province of Saskatchewan, rather than be led into a network or arrangement constructed by others, it will have to make its decision quickly. Software creation would have to begin immediately, support personnel roles would have to be planned and provided for, and a more full-scale pilot project would have to be implemented to determine more accurately the costs associated with this method of submitting assignments.

If the U of S is not prepared to write the custom software needed and provide the human resources required to maintain a full-scale program of electronic assignment submission, other alternatives might be possible.

Possible Alternatives to Electronic Submission

Having completed the pilot phase, it behooves us to examine alternatives to the procedures tested. In all but the last alternative, several advantages of using electronic submission, identified above, would be lost.

- *The status quo (Canada Post).*

  There are a number of advantages to the way independent study course assignments have been submitted in the past: Canada Post is relatively inexpensive, the cost of at least half the transactions are borne by the student without complaint, students have easy access to post offices, and there is no frustration and delay on the part of students when submitting their assignments (unless they have to stand in line to buy stamps). On the other hand, there is still the major drawback that prompted the pilot project in the first place: No matter how efficient Canada Post may claim it is, the turn-around time for assignments is still unacceptable from an instructional point of view.

- *Use commercial courier services.*

  Another solution might involve using commercial courier services, which now reach quite broadly into the rural communities. Points of access to couriers are not nearly as numerous as to Canada Post; still, most students travel to neighboring communities sufficiently often that assignment submission via courier service might be viable. The cost is quite a bit higher, of course: Sending a typical assignment in will cost several dollars, as opposed to less than a dollar with Canada Post. (Of course, getting it back the

same way will cost the University several dollars, as well.) With one-day courier service being more or less the standard, the problem of turn-around time is lessened considerably. A thorough cost-benefit analysis of this procedure is probably warranted, but this method of submission still eliminates some of the advantages of using the computer.

- *Use facsimile machines.*

  Facsimile (Fax) machines were not commonly available when the Project was first initiated; today, they have dropped in price so much that they are becoming quite common. It is conceivable that a regional network of Fax machines (perhaps at the Regional College offices) could be used to make the submissions. This method also deserves a thorough cost-benefit analysis, but it should be recognized at the outset that, being paper-based, it eliminates only the first and last of the three steps involved in handling student assignments (getting it to the University, handling it within the University, and getting it back to the student). The Fax method of submission can be viewed in isolation from the method used to create the document (word processing on a microcomputer), but if the best features of the document creation are to be retained, then Faxes as well as microcomputers will have to be provided. The cost, of course, rises by the price of the Fax machines involved. Too, there is lost the potential of working from one's home (either student or instructor), unless numerous Faxes are available. Finally, relevant to instructional efficacy, the student's remarks about the legibility of the instructor's typed comments as opposed to his (potentially illegible) written ones becomes germane in this consideration. One might hypothesize that more and lengthier comments would be inserted in electronic assignment grading than in paper-based grading, because of the relative ease of making insertions at the points they are needed, but that question awaits empirical validation.

- *Develop a bureaucratic system for handling submissions electronically.*

  Finally, the possibility exists that both the students and the instructor could be relieved of some of the burden of handing assignments electronically by assigning those functions to Regional College staff and PTDS staff. Although this *may* make for fewer technical problems, there is no guarantee that it will do so, even if the requisite staff time were to be made available: The problems that cropped up during the Project were sufficiently elusive that we were often unable to solve them, and we merely circumvented them in the name of expediency. Promulgating that mode of operation on a larger scale surely would not be cost-effective in the long run. Also, another level of bureaucracy would be interposed between the students and the instructor, just as it is now

with the paper-based model, and bureaucracy inevitably means increased delays.

Conclusions and Recommendations

There seems little doubt that there are good reasons to implement electronic submission of independent study course assignments by distance education students, both from an instructional and from an administrative point of view. However, it is equally clear that such a program would be fairly expensive to operate, both in terms of dollars expended for telephone and computer charges, and in terms of new and changed personnel roles. The administrative overhead that would be required, on the part of the students or College personnel acting on their behalf, on the part of the instructors, and on the part of PTDS and Computing Services staff, should not be underestimated. Before electronic submission can be instituted on a large scale at the U of S, some custom software will probably have to be developed to expedite the process of submitting assignments.

The advent of the Saskatchewan Communications Advanced Network (SCAN), with its presumed availability of communication lines, may have a marked effect of reducing or eliminating telephone toll charges.

A larger-scale pilot project (*not* full-scale), specifically designed to focus on instructional benefits of the technology employed, to assess qualitative differences in student assignments that can be attributed to the technology provided, and to determine more accurately the costs associated with electronic submission, is recommednded as a worthwhile follow-up to the ground-breaking that has been done. In order to accommodate the necessary software development and testing beforehand, the time-line for such a project would have to be the 1990-91 academic year. If such a follow-up pilot project were to be undertaken, a decision to that effect would have to be made within a few months.

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Appendix A

Proposal to the Campus-Wide Investment Program (CWIP)

Using Microcomputers as a Communication Medium in Distance Education: A Proposal for a Pilot Project

Earl R. Misanchuk
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December, 1985

There has been growing interest recently, within the University of Saskatchewan community, in the use of distance education methods for reaching previously-inaccessible student populations. To provide effective distance education, the delivery method must be both efficient and effective. More than fifty years of experience with the traditional correspondence courses has shown that there exists a student population within the province that is willing and able to learn university-level material in that format, despite the extraordinary dedication such an undertaking requires. During the last decade, the correspondence course program suffered somewhat, losing students to aggressive correspondence programs emanating from universities in Ontario, Alberta, and Oregon. Within the past three or four years, however, the University has renewed its commitment to the endeavor, as evidenced through the hiring of an instructional designer, and a renewed emphasis on developing and marketing a program approach which essentially offers distance students the first two years of an Arts & Science degree.

In this renewal, considerable progress has been made toward ensuring the quality of the course materials. There is both formal and informal evidence (in the form of course examinations and evaluations, and instructor feedback, respectively) that in most cases the quality of learning experienced by distance students is at least as high as that experienced by on-campus students.

Efficiency of delivery of the educational experience, however, is another matter.

A perennial problem associated with independent study (correspondence) courses has been the extremely slow rate of exchange of information between professor and student. Typically, professors have sent students packages of learning materials (texts, course notes, perhaps even audio tapes), and students have mailed in assignments. The time that elapses between a student's completing an assignment and his or her receiving feedback from the professor is usually of the order of three weeks (up to one week in the mail; a week to ten days in receipt at the Part-time Degree Studies Office, being passed to the instructor, being graded, and being returned through the Office; and up to another week in the return mail).

The feedback professors are thus able to provide is virtually useless from the point of view of learning. By the time a student receives a professor's comments, she is likely to have forgotten much of her thinking at the time of the preparation of the assignment.

Furthermore, distance education students often experience a sense of isolation, not being able to ask questions of the professor as an on-campus student might at a class, or even being able to ask one of their fellow students. The same phenomenon--the lack of opportunity for interaction--makes it very difficult to create learning materials for use with distance education courses that actually capitalize on basic principles of teaching and learning.

Various methods have been attempted to improve upon the feedback lag and the lack of interaction--including the use of telephone conference calls, or teleconferencing--both at the U of S and elsewhere, but no entirely satisfactory solution has been found.

The use of computers appears to have promise for ameliorating the problems, however. It has a number of advantages:

(1) written materials, such as those typically required in university courses, can easily be transferred between professor and student, obviating the dependence upon the (slow) traditional postal system;

(2) unlike with telephones, scheduled meeting times do not have to be observed: either party can send a message to another at any time, whether or not the second party is in a given location at that time, and replies can be dealt with the same way;

(3) students at different locations can communicate with one another as readily as they can with the professor, permitting the student-student interchange that is so desirable but so hard to accomplish in a distance education setting.

The primary disadvantage is the need for access to a computer or terminal; a lesser disadvantage is the limitations imposed by the students' typing abilities. A third potential disadvantage, which does not really apply in the Saskatchewan situation (by virtue of the availability of SaskTel's Agritex service), is the need for low-cost computer communications.

The Part-time Degree Studies Office proposes to implement a distance education version of Sociology 110 - Introduction to Sociology, which utilizes computer communication as a key element for professor-student and student-student interaction. This course would be offered on a pilot project basis, over a period of two years, using a combination of course materials already in use for a correspondence

version of the course and materials specially designed for the project, and would carry regular university credit.

The course would be advertised to potential students as an alternative to the regular offering, and would be offered in several (yet-to-be-determined) locations where community colleges have indicated interest and provided support to the project. Textual materials (textbooks, course guides) would continue to be a mainstay of the projected course design; only relatively small amounts of textual material would be delivered via the computer system (particularly any subject-matter amenable to CAI, and self-tests for students). Graphical materials (in NAPLPS format) would also be delivered via the computer.

Students would access the campus-based mainframe computer once or twice a week (or more frequently if they so desired), from microcomputer work-stations located at two or three community colleges. Access would be through SaskTel's Agritex service, thus considerably alleviating the burden of communication costs.

Students would be encouraged to submit written assignments via the computer, but would be permitted to use the slower, more traditional methods if technical problems arise or if their typing skills limit effective use of the computer.

Prof. John Thompson of the STM sociology department has already agreed in principle to undertake working with Prof. Earl Misanchuk of DECR to develop the necessary course materials and offer the course on a pilot basis, under terms similar to those under which more traditional correspondence courses are developed.

The short-term goal (Phase I: 2 years) of the project is to determine what is necessary to implement, and to evaluate the potential of, computer communications for university-level distance education courses while actually delivering University credit courses to distance students in the province. A full evaluation report will be among the products of the project.

Medium-term goals (Phase II: 2-5 years) are to (1) extend the configuration to include a variety of learner-owned microcomputers, in locations other than community colleges (if the results from Phase I warrant it); (2) to develop instructional materials and/or software to develop critical reading skills in learners; and (3) to develop instructional materials and/or software to develop learners' writing abilities.

Future possible candidate courses for similar development, given a successful outcome from the pilot project, are Psychology 110 - Introduction to Psychology, Sociology 233 - Introduction to Sociological Theory, and EDCCV 420 - Processes in Continuing Education. (Discussions with professors teaching these courses via independent study have not yet been undertaken.)

Resources Required

A fundamental precept of distance education is that the student is freed from constraints of space and time; that is, a distance education student should not need to appear at a particular place at a particular time in order to complete her studies. In terms of the proposed pilot project, it would be ideal to have a microcomputer provided to every student, for use in his or her home. Obviously, such an arrangement would currently be impractical. In striving toward the eventual goal of completely freeing the student from constraints of space and time, however, much remains to be learned. We expect that despite the minimal constraints associated with providing a student with only local access to a microcomputer, the proposed project will provide an environment in which many of the problems of delivering instruction in this form can be worked out.

Microcomputers should be used in the pilot project, rather than terminals, so that students can compose messages off-line, then submit them to the host at the University. Similarly, reading computer mail or conference files could be done off-line. Communications costs could thus be minimized.

We propose that for the initial phase of the pilot project, three microcomputers be located at each of three different community college offices (or other suitable location determined in conjunction with the community college), and that these machines be available on a walk-in basis for students taking the Sociology 101 course. Registration in each location would be held to 10-15 students to eliminate, as much as is feasible, the possibility of students having to wait for access to a machine. Thus eleven microcomputers are required for the initial phase of the project (one each for the course developer and professor, in addition to remote student work-stations). These micros must be capable of composing and sending messages in ASCII (using a simple-to-learn word processing program or editor), and of receiving both ASCII and NAPLPS. They should also be compatible with the courseware program chosen for the CMI/CAI and testing components, and of acting as terminals for the electronic mail/computer conferencing program chosen. Access to and disk space on a suitable mainframe on campus will be needed, as well as two Agritex ports into the campus mainframe and Agritex user lines at each of three community colleges. Guaranteed or priority access to the campus mainframe (as opposed to receiving a "Busy, 6 waiting" message) would have to be a primary consideration for students taking the proposed course.

A powerful, easy-to-use electronic mail/computer conferencing package is essential. It must be capable of transferring any kind of file, including NAPLPS, between and among all students and the instructor. A courseware authoring and delivery system is needed to prepare and deliver those aspects of the course that can be done via CAI, and to present and deliver student self-tests. A student record-keeping system would also be beneficial, particularly if it were flexible enough that inputs could be made to it other than from integral parts of the CAI presentation system. The courseware package should be capable of handling NAPLPS information, or at least of interfacing with a NAPLPS database program.

To recapitulate, in order to advance the proposed pilot project, DECR would require the provision from central University sources of the following hardware and software:

(1) 11 microcomputers capable of the functions described

(2) word processing programs or editors for (1)

(3) CMI/CAI software (mainframe and work-station)

(4) electronic mail/computer conferencing software (ASCII & NAPLPS)

(5) access to mainframe disk space

(6) 4 Agritex information provider ports into mainframe

(7) 5 Agritex user lines (1 per community college; 1 each for the Subject-Matter Expert and instructional developer)

In addition, DECR would require access to programmer and systems analyst services equivalent to approximately one-quarter person for the period Mar/86 - Aug/87, during which the course is being developed and the remote sites are being established, and for occasional services for trouble-shooting for the remainder of the pilot project.

We respectfully request that the Office of Information Technology Services undertake to garner the necessary resources to allow us to put the proposed pilot project into operation. The Extra Sessions Office of the Division of Extension and Community Relations will undertake to provide the necessary course content and development expertise, materials, and facilities, and the necessary administrative structure and personnel to deliver the course for the duration of the pilot project. We further request that the OITS provide guidance with respect to the selection of appropriate hardware and software for the purposes outlined above, as we have been unable to obtain such information from the local representative of Digital Equipment Corporation, despite several attempts.

We would be pleased to meet with OITS personnel to more completely define the pilot project specifications, if deemed necessary. In the light of our limited technical knowledge, and without formal indication of approval in principle of the concept and indication that the University is able to provide DECR with the hardware, software, and

human resources necessary for the undertaking of the project, we feel unable to provide more detailed information without assistance.

PROPOSED TIMETABLE

Due to the fact that Sociology 110 is a 6-credit course, it cannot be offered until the beginning of a fall session. Because of the development time required and the experimental nature of the proposed pilot project, it would be impossible to develop the course in time for offering in the fall of 1986; therefore the schedule below works backward from Fall, 1987. The milestone dates below are not rigid, but are indicative of the time spans required to bring the project to fruition.

1986

Jan 15 Decision to proceed; identify personnel

Jan 30 Roles identified and assigned

Mar 1 Acquire Hardware and Software Package #1 (2 microcomputers, software for micros, software for mainframe, 1 Agritex IP port, 1 Agritex user port)

May 15 Familiarize personnel with hardware & software (learning curve)

Aug 1 Course format and materials specifications and parameters fixed; development begins

1987

Mar 1 Course materials finished, including developmental testing at remote or simulated remote sites

Apr 1 Course offering inserted in Part-time Degree Studies Calendar

Jun 1 Acquire remainder of hardware and software

Aug 1 Distribute remainder of hardware and software, and check out at remote sites; acquire additional Agritex ports

Sep 1 Students begin work; evaluation/monitoring begin

1988

Apr 15 Students complete course

Jun 1 Interim Evaluation report completed

Aug 1 Course revised in accordance with findings of Interim Evaluation

Sep 1 Students begin work; evaluation/monitoring begin

1989

Apr 15 Students complete course

Jun 1 Final Evaluation report completed

Appendix B

List of Contents of the Orientation Document Students Received

The *Orientation* document provided:

- an overview of the course as run under the Project (how it differed from the standard version of the course, and why)
- a conceptual overview of how the Mac is used for communications, and for other purposes
- a section intended to minimize any fear of approaching the computer
- suggestions on the sequence of activities for learning how to use the Mac and WriteNow
- instructions on how to do backups, and their importance
- information on how to care for floppy disks
- step-by-step instructions on
    - the use of Binhex to prepare files for transport
    - how to use Kermit to dial up and log onto and off the mainframe
    - using Kermit to upload files to the mainframe
    - checking the mainframe directory to determine if graded assignments have been returned
    - using Kermit to retrieve a file from the mainframe
    - un-Binhexing a downloaded file to prepare it for use with WriteNow
- a few trouble-shooting guidelines in case things go wrong
- a description of and instructions for using the
    - mainframe electronic mail facility for communication with the instructor and with other students
    - University Library's on-line card catalogue to locate suitable research materials which could then be mailed to the student.

Appendix C

"Contract" Used With Regional Colleges

Sociology 110 Distance Education Pilot Project
Using Microcomputers for Communication

You may recall that the U of S is undertaking a distance education pilot project for the 1988-89 term in which students electing to register in a special section of Sociology 110 in the Independent Studies Program will use microcomputers to communicate with their professors on campus and to submit their assignments for grading electronically. Because this is a only a pilot project, the format will be offered in only a few sites.

We have been discussing the possibility of being involved in the project with a number of Regional Colleges, and are now in a position to firm up some of the details of the project. In order to meet calendar deadlines, we will have to decide very soon exactly in which sites we will be able to offer the special section; it is likely that we will not be able to offer it in all the locations where we have talked to people unless the Colleges themselves are able to provide additional equipment for use in the project. With the funds available to us, we are able to provide for only four sites, and we have had interest expressed by more sites than that. The equipment required for each site costs $6372, FST exempt. Obviously, we will be able to serve more sites if Colleges are able to cost-share equipment with the U of S.

This document is an attempt to lay out the expectations the University has of the Regional Colleges cooperating in the experimental distance education course in Sociology using computers for communication. Although it is obviously not a legally binding document, it is intended as a kind of psychological contract which will hopefully minimize the number of rude surprises that sometimes occur in joint ventures. It attempts to spell out what the University will and will not do as part of its contribution to the project, and what the Regional College agrees to do and not do if it decides to enter into the cooperative venture.

If any of these conditions is unreasonable for your particular situation, yet to still wish to be involved, please contact Earl Misanchuk (966-5555) and we will see if it can be resolved through negotiation.

We anticipate that each College location will have a maximum of 6-8 students involved in the project. Until we know what kind of access requirements students will have, the number of registrants will be kept well below what might eventually be determined to be optimum. Thus even if off-campus classes in the same subject are being offered by the College, there should be little detrimental effect on those enrollments.

Location and Facilities

The College agrees to provide sufficient space to accommodate two Macintosh microcomputers, a modem, and a printer. One micro will be connected to the printer, the other to the modem. Each micro should have a minimum of $2\ 1/2$ ' x 5 ' of table or desk space devoted to it. The height of the surfaces should be approximately 26" (typing table height, rather than standard desk height).

The printer requires only about 2' x 2', and should be located within about 6 feet of the micro to which it is attached.

The modem occupies negligible space, but must have a voice-grade telephone line with a jack on the phone within 8 feet of the micro to which it is attached.

The two micro locations need not be adjacent, although it would probably be most convenient to have them adjacent. The space does not have to be devoted exclusively to the micros, but any other use of the space must give first priority immediately to any student use of the micros.

Locations should be selected which have adequate light for reading, but do not have excessive glare. Specifically, locations near windows should be avoided if possible. If a window location is unavoidable, the furniture should be arranged so that the screen of the micro is at right angles to the window, rather than parallel to it. Dusty or excessively warm locations should be avoided.

Each equipment location must have a source of electrical power. One standard wall outlet is required for each micro; both micros could be plugged into the same duplex wall outlet if they are adjacent. If the power source is more than 6 feet from the equipment, a grounded extension cord (provided by the College) may be used. Both the printer and the modem also require power, but can be plugged into the back of the micros, hence do not require separate outlets.

The locations chosen should have easy access throughout normal daytime and (especially) evening hours, and there should be ready parking available during those times.

Priority of Use of Equipment

The College agrees to give first priority of access to both the space and equipment to students in the project.

College staff may use the equipment when no students wish to do so.

The College agrees to take reasonable steps to limit the use of the equipment by other than students in the project and College staff.

Costs of Telephone

The installation of the phone line required will be the responsibility of the College (approximately $77); the U of S will reimburse the College for monthly rental charges and toll charges on the line for the duration of the project.

The College agrees to take reasonable steps to monitor the use of the modem to avoid long-distance calls being made to numbers other than the U of S.

Equipment

For each College selected for inclusion in the pilot project, the U of S will provide sufficient equipment for one site, for the duration of the project: 2 Macintosh Plus microcomputers, one ImageWriter II printer, one Apple personal modem, and necessary connecting cables. Equipment for any additional sites would have to be provided by the

College from existing inventory, or purchased by the College (at a cost of approximately $6400 per site). Any equipment purchased by the College would, of course, remain with the College upon the completion of the project.

Software

The U of S will provide all software needed for the project. Any software solely for College use will be the responsibility of the College.

College staff agree to store and supervise the use of software (issue it to students on demand and receive it from students when they are done with it). College staff will also maintain backup copies of software and make duplicates in the event of damage to the originals (training on how to do this will be provided as part of a workshop).

Supplies

The U of S will provide all necessary disks, computer paper, and ribbons. College staff agrees to monitor consumption of supplies in a reasonable manner.

Staff Supervision

The College agrees to designate at least one individual (but preferably two) to act as monitors for the project and trouble-shooters for equipment problems. These individuals will not be expected to devote large amounts of time to project activities. College staff will not be expected to teach students how to use the equipment (and students will be so informed), but rather to act as a last-resort source of assistance to students who encounter unusual problems. They will assist in developing a schedule for student use of the equipment, if one is necessitated by high student demand, and will monitor the use to ensure fair access to all students (including ensuring that equipment is being used only for project-related purposes). They will also be expected to change printer ribbons when needed and to ensure that sufficient paper is in the printer.

In the event of equipment malfunction, college staff will communicate with the U of S via either telephone or electronic mail. Replacement equipment will be sent out via bus express as soon as possible. College staff will receive and install (connect power cords, etc.) the replacement equipment, and pack the malfunctioning equipment in the shipping containers for return to the U of S by bus express. When repairs are completed, college staff will repeat the replacement process.

The staff selected should be positively disposed toward the project.

Staff Training

The U of S will hold a two- or three-day workshop in Saskatoon in late March or early April to familiarize designated College staff with the Macintosh system and the manner in which it will be used in the project. The College is responsible for transportation and accommodation of its staff during that time. There will be no registration fees or other costs associated with the workshop.

Promotion

The U of S will advertise the availability of the course through its calendar and, if necessary, in local media.

The College agrees to have its staff do word-of-mouth advertising to prospective students. It should be remembered that students must be allowed to self-select themselves into the project (rather than being pressured into it); that at least minimal typing skills are required; and that students must be willing to invest approximately 6-10 hours of time in learning to use the computer system, in addition to the normal requirements of the course. Remember, too, there is a limit of 6-8 students per site.

Appendix D

Topics Taught in Orientation Workshop for College Supervisors Involved in the Project

Sociology Project Workshop - Outline

1. Overview of Project

1.1. Which locations involved

1.2. How students will submit their work

1.3. Provide copies of instructional materials

- Course Guide
- Project-related materials
- Overview and explanation of disks

1.4. Expectations of college staff

- Student access to facilities (review "contract")
- No hand-holding on Mac
- Minor trouble-shooting/maintenance only
- Remind students to wean from paper gradually
  - Typical pattern of adjustment to writing on the screen
- Help if disks damaged or lost
- References in Orientation to help re-creating disk contents
  - p. 6 right col 1/2 way
  - p. 17 left col top
  - p. 18 end
- Printer and modem manuals

1.5. Expectations of university staff

- Who to call about what
  - Hardware/software = me (5555) or Jim (5589)
  - Sociology = John (8943)
  - Administrative = Grace (5562) / Carol (5563)

1.6. Means of communication

- Phone
- E-mail: rationale for knowing Mac

2. Intro to Hardware

2.1. Placement, facilities (review from contract)

2.2. Hooking Up

- Power OFF
- Orientation of connectors to each other
- All connectors joined
  - Checklist
- Modem to one, printer to another

2.3. Macs and printers turned ON, controlled from fan

2.4. Shutdown and power off procedures

3. Overview of Software

3.1. What it does

3.2. Kinds

- System & Finder/Desktop analogy
- Applications
  - WriteNow
  - Kermit
  - Binhex5
- Documents

3.3. Telling one kind from another via icons or windows

4. Using the Mac (including practice)

4.1. Booting

- What is a startup disk?
- Screen brightness; light control/placement

4.2. The Mouse and the keyboard

- Moving, clicking, & dragging

4.3. Selecting & choosing

- Icons
- Menus

4.4. Manipulating windows

- Changing size of window
- Moving window
- Opening other icons
- Closing window
- Using scroll bars

4.5. Starting Applications Programs

- Creating a new document
- Saving a document on disk
- Editing a document
  - Cutting and pasting

4.6. Organizing documents

- Using folders
- Selecting more than one icon
- Changing views of a window

- Using DA's

4.7. Copying files

4.8. Copying disks

4.9. **Making duplicates and backups**

- Locked disks and documents

5. Care and Distribution of Disks

5.1. Do's and don'ts in handling and storage

5.2. How to make a duplicate from a backup disk

5.3. Copyright concerns

5.4. "Foreign" software and viruses

6. Troubleshooting

6.1. Phone me if possible

6.2. System bomb

6.3. First solution: power down

6.4. Printer jams

6.5. Select light on printer

6.6. Disk read/write errors

6.7. An application can't be found for this document

6.8. Deactivating the Mini-finder

6.9. "Unable to read" an initialized disk

- Fiddle with middle

6.10. Exchange suspect component (e.g., mouse, keyboard, disk drive) & re-test

6.11. Static from modem

- Make regular phone call to check availability of SKYBLU

7. Maintenance

7.1. Mac

- Screen free of fingerprints
- Keyboard un-sticky
- Glare reducers (hood)

7.2. printer

- Ribbon replacement
- Paper feed
- Jamming: what causes it?

7.3. Disk drive

- Dragging to trash to eject
- CMD-SHIFT-1 or -2 to eject

- Eject button on external drive
- Labels jammed
- Paper clip as last resort

7.4. Mouse

- Cleaning
- Mouse pad hold-down

8. Failed equipment

8.1. Phone ahead for replacement

8.2. What to pack it in

- Keys

8.3. How to ship it

9. Subject-matter concerns

10. What about supplies?

10.1. We will provide paper & ribbons

10.2. Getting more (phone or e-mail)

11. How phone calls are billed back to us

11.1. Bill us back at end of project, including copies of original bills

Appendix E

Orientation to Using a Microcomputer As a Distance Education Communication Tool
(Please Read Me First)

Note: Pagination in this appendix corresponds to that in the original document.

Orientation to Using a Microcomputer
As a Distance Education Communication Tool

Earl R. Misanchuk, Ed.D.
Professor of Extension
University of Saskatchewan

Please Read Me First

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Introduction

In other packages sent to you, you will find the *Course Guide* and *Article Reprints* that, along with the texts, form the core of instructional materials for the normal Independent Studies course. Since you are taking the special version of the course which uses a computer to communicate with your professor (send in and retrieve assignments, ask questions, etc.), you will need to familiarize yourself with this package of materials, as well.

This activity of learning to use the Macintosh Plus (the computer used with this course) is quite separate and apart from learning the Sociology or History or English that is the actual content of the course, and, strictly speaking, it should be possible to work on both paths simultaneously. However, it might be most reasonable to start as soon as possible to learn how to use the computer—perhaps even before getting into the subject-matter of the course—for the following reasons:

(1) you will need to know how to use the computer in order to send in your first assignment;

(2) you might find it very convenient to use the computer to actually write your first assignment, since editing is so convenient;

(3) it may take you a couple of hours to begin to feel really comfortable with using the computer.

It is difficult to predict how long it will take you to become sufficiently familiar with the Mac to be able to use it effectively for this course, but some preliminary trials have suggested that it will take at least a couple of half-days (or equivalent), and perhaps longer.

Of course, it is not essential that you know how to use the Mac before you start working on the actual content of the course. You certainly don't have to have gone through everything in this document before you start studying the content—if you get up to page 19 before you begin to type your first assignment into the Mac, you will be in pretty good shape.

In order to use the Mac, you will have to go to a location where University of Saskatchewan microcomputers have been placed specifically for use with this course. The location of that site is given on a separate, green sheet of paper you received with your other materials. You should contact the site directly to determine exactly what times of day the Macs are available.

That same sheet of paper also lists your Username (the name by which the main computer on campus will know you), and your password, which in conjunction with your Username, will allow you to have access to the main campus computer.

Using the Mac for Communication

In this course, the Mac will be used (at minimum) as a communication device—a means of getting your assignments to and from your professor without having to wait for the postal system. Typically, in Independent Studies courses, it takes a week to ten days for your assignment to reach the professor, another several days for the professor to read and grade it, and another week to ten days for the assignment to make its way back to you. When you finally get it back, it has probably been out of your mind for three weeks or

so. Theories of learning state unequivocally that immediate feedback aids learning; we suspect that feedback delayed by three weeks produces considerably less effect than does more rapid feedback. Using the Mac, your assignment travels from your hands to the campus mainframe (where it is accessible to your professor) literally in minutes, via a telephone line.

The Mac can also be used to send and receive electronic mail ("e-mail", as opposed to "snail mail", which is the traditional kind). With e-mail, you can ask questions of your professor and receive replies, or send messages to other students in your course. The best part about e-mail is that the recipient of the message doesn't have to be in a specific location at a specific time in order to use the system; hence there is no game of "telephone tag". You can confidently send a message at any time of day (or night) with the knowledge that when the recipient next logs on (connects) to the main computer, he or she is notified that a message is waiting. The message can be retrieved, read, and answered. If you are not connected to the main computer at the time the reply is sent, the reply is stored until such time as you do log on. Of course, when you log on, you are told that the message is waiting.

E-mail messages can be directed to an individual or to a group of individuals.

Other Uses of the Mac

It is possible that for the specific course you are taking, there will be other applications of the Mac. For example, you may use a proof-reading program which checks for simple grammatical errors, or connect to the University Library's electronic card catalogue. In the event that the course you are taking calls for such specialized programs, additional instructional packages will be provided about them.

The instructions that follow, supplemented by information in Apple Computer Inc.'s publication entitled *Macintosh Plus* and T/Maker Company's publication *WriteNow for Macintosh*, will enable you to begin using the Macintosh for creating your assignments for your Independent Studies course. Separate instructions follow later in this document to teach you how to use the Macintosh to "mail" in your assignments for grading and how to use e-mail.

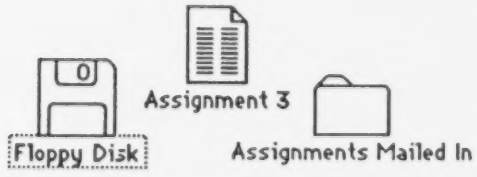
Macintosh Plus is the manual that teaches you how to use the Macintosh Plus computer with any software (programs); *WriteNow for Macintosh* is the manual for the word processing program you will use to compose and edit your assignments. You should start with *Macintosh Plus*, because the *WriteNow for Macintosh* manual assumes you have the prior knowledge it contains.

Do not be intimidated by the fact that there are two manuals involved. You only have to read through parts of each of them; this guide will help you select which parts. Since Apple Computers, Inc. has no way of knowing what a potential customer wants to do with the computer, it has to put into its manual everything there is to know about the Macintosh. You can be more limited in your scope: You only need to know what is necessary to deal with this Independent Studies course. Of course, if you would like to learn more about the Macintosh and/or the word processing program MacWrite, you are certainly free to do so. However, for the purposes of your Independent Studies course, you need only master that which is described in this document.

Orientation to the Mac

The Mac is a machine specifically designed to be easier to learn to use than most other computers. Many hundreds of thousands of people have learned to use the Mac simply by reading the manual(s) and by experimenting. While you may think it unusual, at first, not to have a live teacher hovering over your shoulder while you learn about this so-called high-tech marvel, rest assured that you can learn independently about *it*, just as you can learn independently about Sociology, or History, or English, or whatever.

One of the key features of the Mac (since mimicked by a number of other computers) is its use of icons (**eye**-konz). Icons are little "pictures" that represent objects and activities. For example, a floppy disk (used to store information magnetically) is represented by the icon to the left in the figure below; a *WriteNow* word processing document containing your third assignment might look like the icon in the center; and a folder containing a number of assignments you have mailed in for grading might be represented by the icon on the right. Icons make it easier for you to remember what you are dealing with, because they tend to look like the objects they represent.



Don't Worry—You Can't Hurt It

Before you begin, let me attempt to allay one fear that sometimes appears in newcomers to computers: That you can somehow "break" the machine. I can assure you that, short of using an ax on the thing or pouring a cup of coffee into it, there is nothing you can do to harm it! Apple has gone to great lengths to make sure that you can't inadvertently do so much as erase information from one of the floppy diskettes that computers use, without double-checking with you and asking "Are you sure you want to do this?"

On the other hand, while we don't want to discourage you from a little experimentation, you should try to exercise a modicum of restraint. There are a few things that you can "adjust" that, while they won't "break" the machine, may cause either you or a subsequent student to become confused, because your "adjustment" made things appear different on the screen than the manuals or this document say they appear. Use this as a rule of thumb: Experiment away, but before you do, take note of how things look and remember what changes you make, so that you can return them to their original states when you are done.

How Does It Do That?

A second bit of advice: Don't assume that you have to know everything about the computer in order to make use of it. You don't need to know how it works. Indeed, if you want to know how it works, you won't find out in this course—you'll have to take a course in Computational Science. In this course, the Mac is simply a tool. It is a means of getting a job done. You don't need to know how the Mac accomplishes what it does any more than you have to know carburetor theory in order to drive a car, so don't feel you are "missing something" if you don't always

understand the mechanics of the system you are using. Sometimes—and this is one of them—it is enough just to know *how* to make something happen, without knowing *why* it happens. (We don't completely understand gravity yet, but that doesn't stop us from making use of it to run an elevator!)

Working Along With the Book: Manual Labor?

One thing you should plan on doing while learning how to use the Mac is working along while you read the instructions in the manuals. The manuals incessantly suggest that you try things. Please do. You will learn faster and better that way than if you simply read along and look at the pictures and diagrams in the manuals. Don't be terribly concerned if you forget how to do certain things. If that happens, just reach for the manual and try to refresh your memory on how it is accomplished. In the beginning, you should read the manual with a view to finding out what can be done, and worry less about remembering how it is done. After a few trips back to the manual to refresh your memory on how to accomplish something, it will become second nature.

If you are a driver, you will remember that when you were learning to drive, at first it took all your concentration just to remember all the things you were and weren't supposed to do. As you got more experience, however, you began to relax and enjoy the ride, and were able to do other things like talk, chew gum, or hum along with the radio. So it will be with the Mac, eventually.

Become the Master of the Mouse

The Mac relies heavily on your being able to maneuver a device called a mouse in such a way as to cause an arrow to move about the screen. Just as causing a car to turn by rotating a steering wheel took a bit of getting used to, so will the mouse. Just don't give up. It took you a while to learn how to tie your shoelaces, didn't it?

The big advantage of using the mouse, as opposed to being limited to using the keyboard (as in most other computers), is that you have to memorize fewer commands before you can begin to make use of the machine productively.

There's More Than One Way to Skin a Mac

With the Mac, there are often two or three different ways of accomplishing the same task. For example, it may be possible to accomplish a certain action by selecting an icon, then choosing an item from a menu; or the same action might be accomplished by depressing a certain combination of keys on the keyboard. Obviously, you don't need to know all the various methods. Learn whichever method you like best.

Learning to Use the Mac

Learning to use the Mac will require that you be in the vicinity of a Mac Plus, a set of manuals, and appropriate disks. You will borrow the manuals and disks each

time you need to use them, and return them when you leave the Mac site. You will also need the two blank disks that you were sent with your instructional materials.

A Mac site where you will do your work was identified on the sheet accompanying your instructional materials, along with your Username and password. At the Mac site designated, there will be someone responsible for looking after and issuing the manuals and disks that you will need; please ask around till you find the right person.

> ASIDE: The person(s) responsible for overseeing the Mac are not really able to give you instruction on how to use it, however—they have their own jobs to do. Remember, this is an independent study course; you should try to learn how to use the Mac on your own. On the other hand, if you really get stuck, and you've tried everything that the manual(s) and this document suggest to no avail, you may have to approach the person for a little assistance. Rather than giving up in frustration, *do* approach one of them. (Don't forget that other students may be a very good source of assistance.)

You should get the two manuals, *Macintosh Plus* and *WriteNow for Macintosh*, and three disks:

System Tools

This disk is useful to you only for following along with the *Macintosh Plus* manual and learning some of the fundamental actions of using the Mac. Once you have gone through the process of learning the basics, you will probably never have to use this disk again.

WriteNow

This disk contains the word processing program WriteNow. When the *Macintosh Plus* manual calls for the insertion of the *MacWrite* disk, substitute this one. Similarly, when the *WriteNow for Macintosh* manual calls for the WriteNow 1 disk, use this one.

U of S

This disk contains the programs you will need to prepare and send your assignments in electronically.

You will also need to have handy the two blank disks that were sent to you with your course materials. You will soon learn how to create documents that you will store on these two disks, rather than on one of the three above-named disks which will be shared by all students.

At the location of the Macs, you will see two machines. One is connected to a printer, and the other to a device called a modem (pronounced **mow**-dem) which you will learn to use later.

For the first few learning sessions, it really doesn't matter which Mac you use. Later, of course, you will have to use the Mac connected to the printer if you want to make a paper copy of your document. Similarly, you will have to use the one connected to the modem if you want to send your document to the mainframe computer on campus.

Note that both Macs have an external disk drive (i.e., an additional disk drive located alongside the Mac itself). The existence of the second disk drive gives you more flexibility and ease of use. It also means that this document will have to provide additional explanation from time to time, as the two manuals you will

be learning from do not assume that you have an external drive.

Start right in: Read the following comments, then begin Chapter 1 of your *Macintosh Plus* manual, remembering to try things out as you read about them.

You will note that some paragraphs are printed in grey, rather than in black; usually, that means that the material is more-or-less optional information.

You may also notice that some of the things you see on the screen are not exactly like the diagrams in the manual. This is because Apple has continually modified and upgraded the operating system software since the time the manuals were designed, making little improvements wherever possible. In most cases, however, the intent will be clear even though there may be slight differences in arrangement of words or icons.

Be forewarned: You probably won't understand everything the first time through; don't expect to. You may find yourself feeling that although you followed the directions in the manual and got the results shown therein, you don't really understand exactly what it was you were doing, or why.

Try not to let that feeling bother you, difficult as that may be. You shouldn't expect to remember how to do every one of the many new actions you will learn after having tried them only once; nor should you expect to be able to figure out exactly why you are doing each activity, the first time through. (Would you expect yourself to learn a foreign language on your very first exposure to it? Or how to fly an airplane? Learning to use the Mac isn't as complicated as either one of those activities, but I think you get the point.)

The first chapter deals with certain basic skills in using the Mac that you will need to know how to do in order to learn how to do more useful things. Having once experienced how to do a certain basic action, you will at least know where to turn for help when you need to refresh your memory on how to do it. Flipping back through the pages of the manuals is not only encouraged, it is expected!

Bear with us, please. Very soon you'll find yourself doing productive things.

As you try various things, please remember to put things back the way you found them when you are done experimenting, so that other students who use the disks subsequently will be able to find icons and windows pretty much the way the manual describes. It will make their learning easier.

If you do accidentally make a permanent change on the disk, please make this known to the person who issued to manuals and disks to you, and he or she will correct it.

While we're issuing warnings, let's issue another: There is an item called **Use Minifinder...** in the **Special** menu that can lead to considerable confusion if you begin to mess around with it. One of its mates, **Erase Disk**, is another potentially dangerous item. While you are generally encouraged to experiment with various menu selections as you learn how to use the Mac, it is probably best if you do not try any of the **Special** menu items unless explicitly instructed to do so.

As noted, this first section of Chapter 1 deals with a number of very basic actions that you need to know in order to begin using your Mac. Learning to do them is analogous to learning how the ignition

key, brake, and turn signal indicator work on a vehicle.

Learn thoroughly the differences among selecting (clicking on) an icon, double-clicking on an icon, and dragging the icon; these are actions you will use a lot with the Mac. Pulling down and choosing from menus are important, too, as is manipulating windows.

If you get unexpected results (i.e., results different from those shown in the *Macintosh Plus* manual or this document), it may be because you double-clicked the mouse button rather than clicked it once. Usually the unexpected results are a dialog box that give you a message. The dialog boxes almost invariably have an **OK** or **Cancel** button; just click it and you will be back where you started.

There is a difference between the Mac in your *Macintosh Plus* manual and the one you will be using. Yours has a fan housing on top, and the switch for the fan turns on both the fan and the Mac. Hence you should **ignore the picture on the lower left of page 4** of *Macintosh Plus*. Do **not** flip the switch at the back of the Mac; merely push in the fan switch at the very top of the front of the machine, and the little indicator light should come on and the Mac should begin.

Also, page 4 of *Macintosh Plus* states that a yellow piece of plastic pops out of the disk drive when you turn the power on. Your Mac will not have the yellow plastic (a protective device used when the Mac is being shipped) in it.

Proceed with Chapter 1 up to page 22. Read the comments below before going on to page 23.

This a probably a convenient time to learn how to quit using the Mac. You may certainly go on from page 23, but you should be aware of how to quit using the Mac in case you should want to do so.

It's actually not very difficult: Choose **Shut Down** from the **Special** menu. (Don't be afraid to try this item; it's the safest one in the **Special** menu.) Any disks in the drives will be ejected, and you will get a message indicating that it is safe to turn off your Mac now. Simply push in the button on the fan on top of the Mac, and you're done. (Try it now, if you like, or just remember where the exact instructions are, and go on.)

Please ensure that if you create any documents (as you will be instructed to do, later), you delete them from the WriteNow disk before you return the disks and manuals to whomever you got them from. If you wish to keep the documents, you should first copy them to your own disk, then delete them from the WriteNow disk by dragging them to the Trash. The procedure for copying and deleting documents will be explained later; for now, just be aware that it is important for you to leave the borrowed disks in the same condition and with the same contents as you got them.

Read page 23, but stop before page 24.

Here's where you actually start doing something useful with the Mac—word processing.

Now you will have to direct your attention to the *WriteNow for Macintosh* manual; set aside the *Macintosh Plus* manual—you will return to it later.

Learning WriteNow

WriteNow is a simple-to-use, yet quite powerful word processing program. You needn't learn all there is to know about WriteNow in order to begin using it; after just a few minutes spent reading the *WriteNow for Macintosh* manual, you can begin creating a document.

Of course, by going into more depth in the manual, you can learn to be more effective and efficient at using the program.

It is difficult to provide guidance with respect to what you need to learn about WriteNow. You have to be the judge. As you go through the manual, ignore things that you don't think you will need for the moment, if you wish. For example, you probably won't need to know how to set WriteNow to print double-spaced (since your assignments should be submitted single-spaced), or how to set decimal tabs. Most of the features of WriteNow will probably be useful to you at some stage of the course, however. You can skip over some things now, with the intention that you can always return to the manual later and learn how to do them when you need to.

One characteristic of the *WriteNow for Macintosh* manual is that it explains how the use of WriteNow differs for users with different types of Macintoshes (e.g., see the warning near the bottom of page 3). Most of the time, these additional pieces of information don't apply to you. To allow you to skip sections of the *WriteNow for Macintosh* manual that are not really pertinent to you, a color coding system is used.

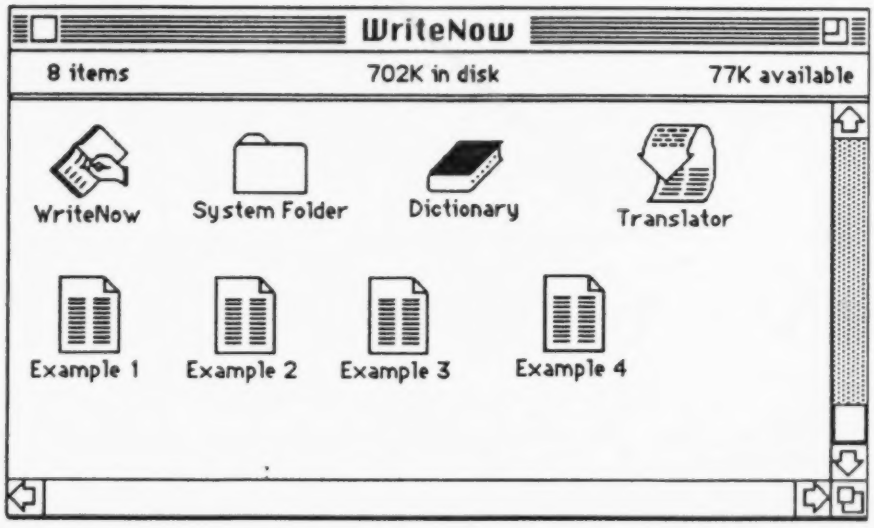
Sections you should ignore are marked in blue "highlighter" pen; sections that are optional are marked in yellow. All unmarked sections may be assumed to be relevant.

Another characteristic of the *WriteNow for Macintosh* manual that you should be aware of: Some learners have found the writing style frustrating in that sometimes a page or two of description of how to do something (referring to a "picture" of the screen reproduced in the manual) is given before you are told how to achieve the same results on your screen. To adapt to that stylistic idiosyncrasy, merely remember to attend to the "picture" in the manual, rather than trying to duplicate it on your screen. Eventually, you will be told how to do it on your screen.

To begin using WriteNow:

- Choose **Restart** from the **Special** menu; the System Tools disk will be ejected, the screen will go black then become grey again, and the Mac will make a sound. (Note: You can switch from one disk to another without doing a **Restart**. If you do so, however, you will find that the Mac will often ask you to swap one disk for another. Therefore, it is usually more convenient to do a **Restart** when switching from one disk to another.)
- Insert the WriteNow disk.

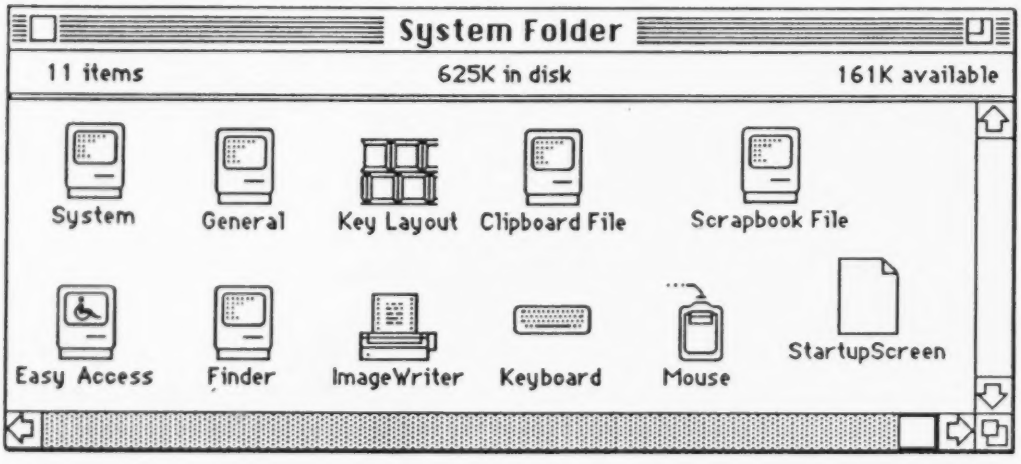
There are some differences between the WriteNow disk you will use and the one shown in the *WriteNow for Macintosh* manual: In addition to the WriteNow program and associated dictionary and translator files, your disk has four sample documents to which the *WriteNow for Macintosh* manual makes reference. More specifically, the WriteNow disk window should contain the items shown in the figure on the next page, although not necessarily in the same relative locations:



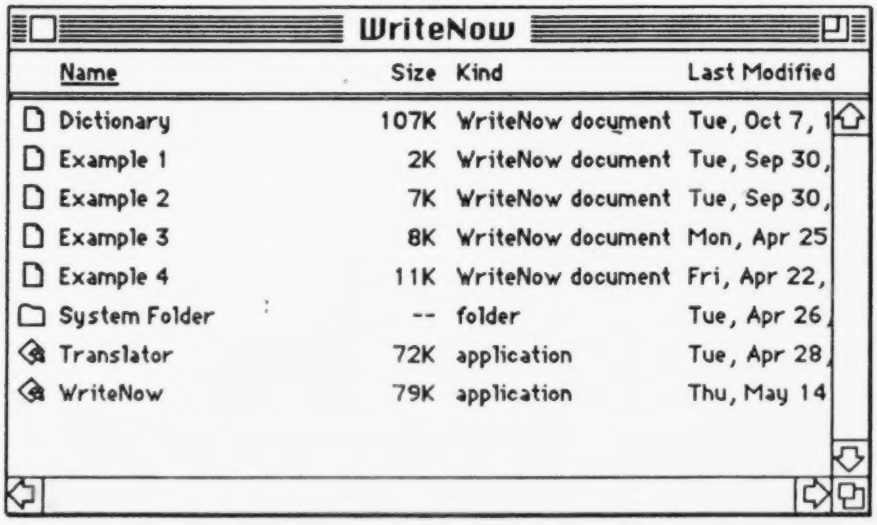
In addition to the ones shown in the figure above, you may find documents carelessly left on the WriteNow disk by an earlier learner. If so, please get rid of them when you learn how, later.

One of the other icons in the window is the System Folder (right). This folder contains information essential to the Mac's operation, and, in general, you shouldn't fool around with its contents. It's OK to simply open up the folder and view the contents, but don't do too much else, or the Mac may fail to operate properly.

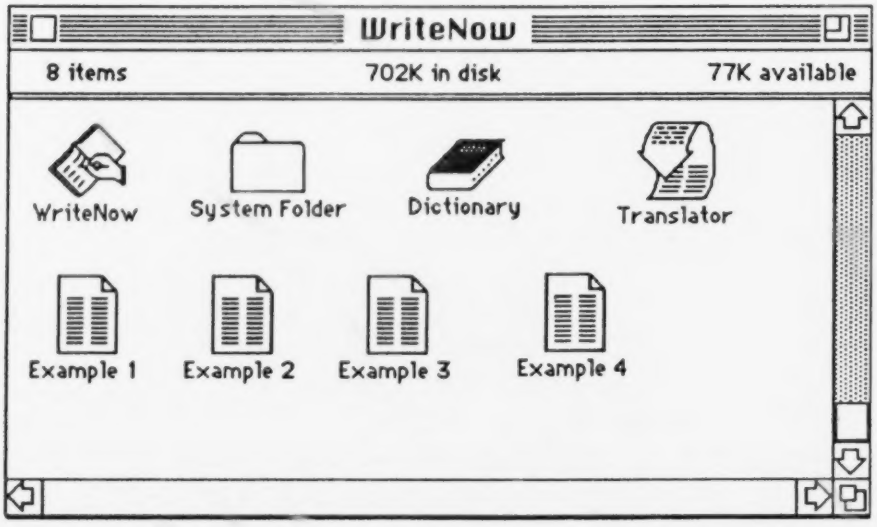
If you open the System Folder, the items you should find in it (although, again, not necessarily in the same relative positions) are shown below.



By the way, if the window of the WriteNow disk looks like this


WriteNow
Name
Size
Kind
Last Modified
Dictionary 107K WriteNow document Tue, Oct 7, 1
Example 1 2K WriteNow document Tue, Sep 30,
Example 2 7K WriteNow document Tue, Sep 30,
Example 3 8K WriteNow document Mon, Apr 25
Example 4 11K WriteNow document Fri, Apr 22,
System Folder -- folder Tue, Apr 26,
Translator 72K application Tue, Apr 28,
WriteNow 79K application Thu, May 14

instead of like this



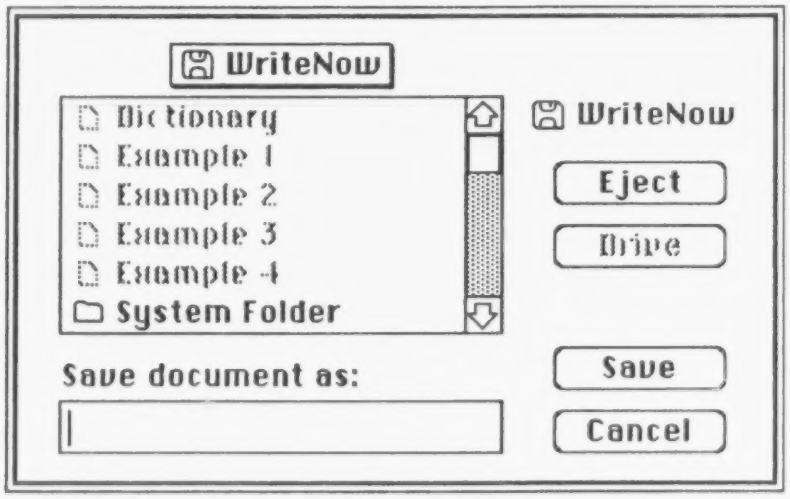
go into the **View** menu and select **Icon**. (There is more information about changing the view on page 36 of *Macintosh Plus*.) Things should then look as you expect, although the icons may be in slightly different locations in the window.

Read and work along through pages 1–16 of *WriteNow for Macintosh*. Follow the instructions below instead of those on page 17.

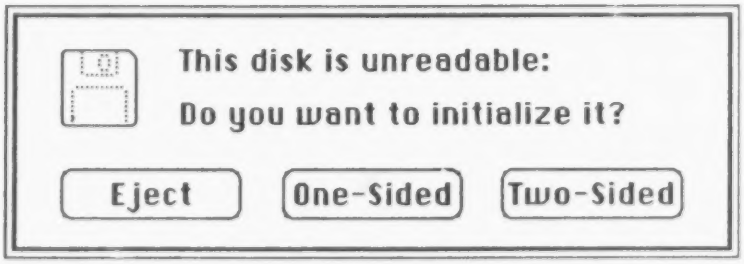
The instructions on page 17 would cause your document to be saved on the WriteNow disk. If every student learning to use WriteNow were to save a document on that disk, it would soon become full, and one would not be able to use WriteNow.

The instructions below will help you save your document on your own work disk—one of the blank disks sent to you.

1. Choose **Save** from the **File** menu. Since your document is untitled, a dialog box (see figure below) will appear to allow you to name your document. (Don't save it just yet, though.)



2. Locate the **external** disk drive (beside the Mac). Insert one of the blank (and unlabeled) disks you received with your course materials into the external drive. You will probably get a message that looks like this (don't be concerned if you don't; just skip over steps 3 and 4):



Click the **Two-Sided** button; you can read the explanation that follows of what is happening as the disk is being initialized:

Before you can use a brand new disk, you must *initialize* it. Disk manufacturers don't know what brand or model of computer their disks will be used on, and different computer manufacturers record data on disks in different ways. So you must take a few seconds to "teach" the disk how you want it to save information.

Initialization has been described as comparable to painting parking stall onto a parking lot surface. Just as the lines on the parking lot assist in orderly parking of cars, so does initialization assist in the orderly "parking" of data on a magnetic disk.

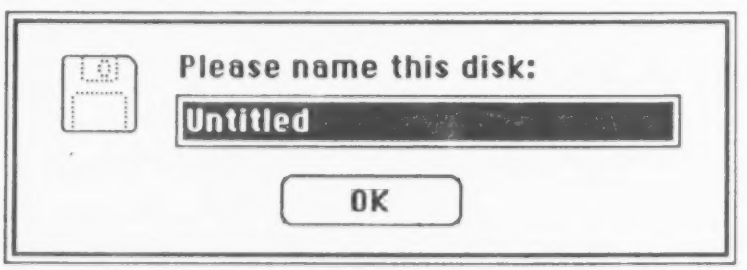
As you might have guessed from the choice offered in the initialization dialog box, disks can be initialized on one side or on both sides. All the disks used with this course are initialized two-sided, and you should initialize your blank disks that way, too.

Normally, initialization only needs to be done once. Indeed, if you initialize a second time, you destroy whatever was previously recorded on the diskette. If you ever get the "This disk is unreadable" message box after you insert a disk that has been initialized, and you click either of the right-most boxes, you will effectively erase the contents of the disk.

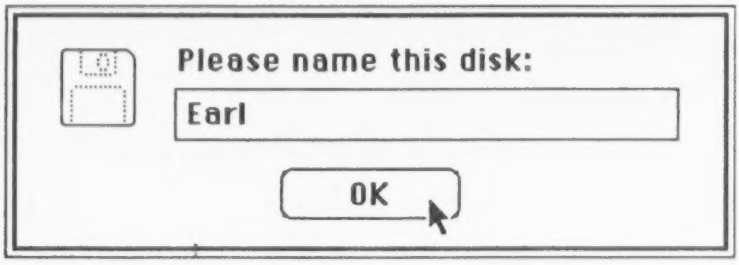
Very rarely, the Mac will present the message shown even though the disk has been properly initialized and perhaps used for some time. If that happens to you, click the **Eject** button, gently jiggle the little metal circle on the bottom side of the disk (perhaps rotating it a bit as you jiggle), and try inserting it again. If half a dozen attempts at this doesn't cure the problem, it is likely that some physical damage has occurred to the disk, and it is effectively useless.

Unfortunately, you would lose all the information on that disk if that happened. However, you will learn later to keep a "backup"—a second copy—of your disk, which you can turn to if you find your original disk unusable.

3. When initialization is complete, the following window appears to allow to give that disk a unique name:



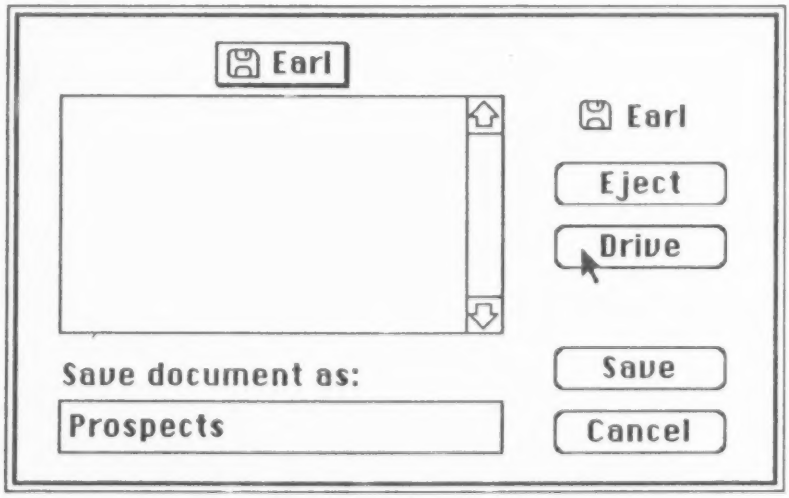
Type in a name for the disk. (I suggest you use your first name, as I have done in the example that follows.) What you type will replace the highlighted (blackened) portion of the window.



4. Click the OK button. Your disk is now initialized, and named. The dialog box shown in step 1 above will re-appear.

If you did not have the dialog box shown in step 2 appear when you inserted your blank disk, it simply means that someone has already initialized that disk. You may proceed, although you won't be able to re-name the disk until later, when you return to the Finder (desk-top).

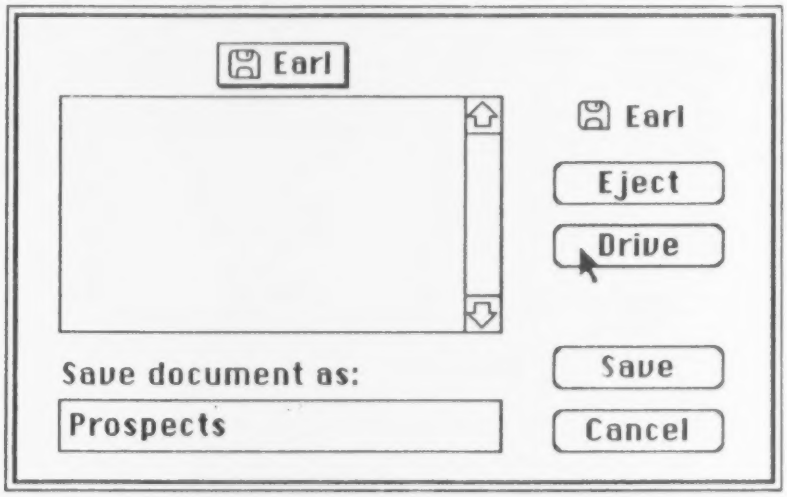
5. Type in the name of the document (Prospects).



6. Before clicking on the **Save** button, try clicking on **Drive**. The effect of clicking the **Drive** button is to change the disk drive on which the document is to be saved. Notice that the name of the disk in the dialog box (Earl) changes to WriteNow, the disk in the internal drive.

   Use of the **Drive** button allows you to save the document on the disk you want it on. If the disk you want the document saved on is not in either drive, you can click **Eject** to eject the disk in either of the drives, then insert the disk you want it on.

   Be sure you have gone back to your own disk before you click the **Save** button. Always save your documents on your own disk rather than on one of the disks you borrowed.



7. Click the **Save** button. After a few seconds of whirring, your document will be safely stored on the disk Earl in the external drive.

From now on, when you choose **Save** from the **File** menu, the document (including any changes you have made to it) will be saved on the disk in the external drive. In effect, the new version of the document (with the changes in it) will simply replace the version that was there before.

Read the following, then return to page 18 of *WriteNow for Macintosh*. Continue working along through to *Printing the Document* on page 27. Stop reading *WriteNow for Macintosh* before attempting to print.

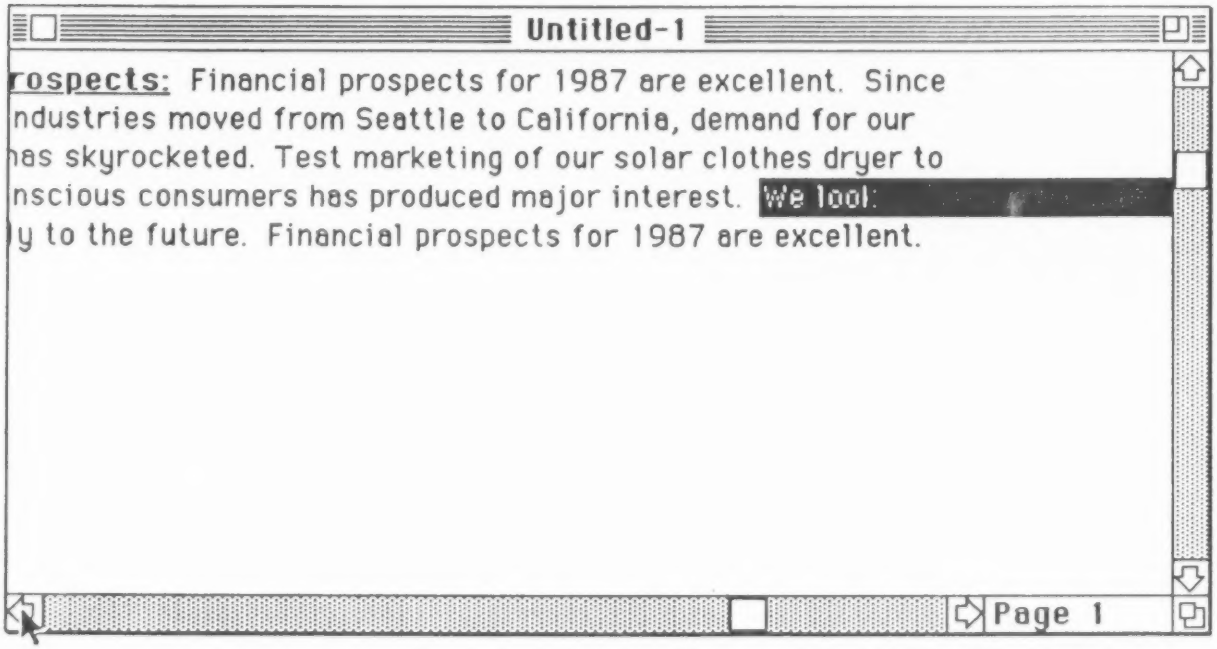
At the bottom of p. 23, in the section **Moving Text**, you are told to select a sentence "We look confidently to the

future", which is on two lines. Some learners have had trouble with this, so here's a little more explanation:

To select a passage on more than one line, you need only drag the cursor downward, then left or right until you get to where you want to be. (Alternatively, you can move upward, if you're working from the end of the selection to the beginning.)

That is, you don't have to drag to the right until you get to the end of the line, then down; you can simply drag down from your starting point. Try it.

If you move the cursor to the very end of a line (either right or left), the view of the document changes: the window scrolls right or left. If you see only the right edge of your document, it is probably because you inadvertently caused the window to scroll to the right. If so, click the left scroll arrow (at the bottom left of the window, where the cursor is in the diagram below) several times until the document is once again centered on the screen. Again, try it.


Untitled-1
rospects: Financial prospects for 1987 are excellent. Since
ndustries moved from Seattle to California, demand for our
as skyrocketed. Test marketing of our solar clothes dryer to
nscious consumers has produced major interest. We look
y to the future. Financial prospects for 1987 are excellent.
Page 1

If you see only the left-most edge of your document, you have probably scrolled to the left. The cure is the same, but in the opposite direction.

Read the following before attempting to print.

Be sure you are working on the Mac that is connected to the printer before attempting to print. **Do not attempt to change the printer connections or damage may result.**

Ensure that the printer is turned on: If the three green lights on the lower right are lit, the printer is on. If they are not lit, depress the topmost button (labelled 'error pwr'), and the light should come on.

Pay particular attention to the light next to the button labelled 'select'. If it is not on, depress the 'select' button as necessary until the light does come on.

Paper is usually in the printer; if it is not, seek help.

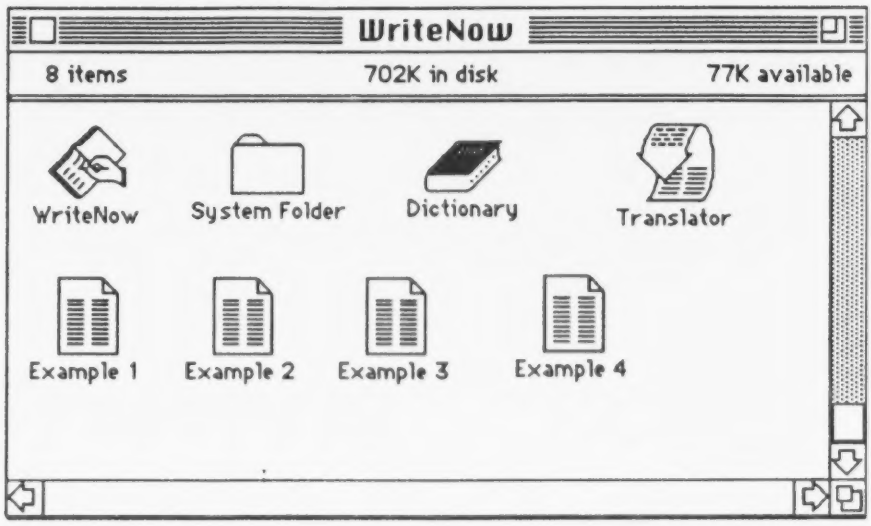
Rotate the knob on the right of the printer platen (roller) until the perforations marking the top of a page are directly beneath the paper bail (the silver rod on which there are two rubber rollers).

If, after you've clicked the **OK** button on the dialog box shown at the top of page 28 of the *WriteNow for Macintosh* manual, you get the following dialog box, do just what it suggests: Press the 'select' button on the printer once or twice as necessary to get the 'select' light to turn on, then click **OK**.

If you decide to quit at the end of Chapter 1 of *WriteNow for Macintosh*, remember to remove (drag to Trash) any documents you may have inadvertently created on the WriteNow disk. (It's OK to leave documents on your own work disk, however.) Directions for removing documents are on p. 68 of the *Macintosh Plus* manual. If you did create a document on the WriteNow disk and you want to save it, copy it to your own disk before dragging it to the Trash from the WriteNow disk.

Information on copying and moving documents, renaming them, and creating folders into which you can put a number of documents can be found on p. 65–67, p. 64, and p. 62–63 of the *Macintosh Plus* manual, respectively.

If you experiment with discarding documents, make sure you only throw away documents that you (or a previous learner) created, not any application programs or files originally found on the WriteNow disk. When you are done experimenting, your WriteNow disk window should contain the items shown on the next page.



If you inadvertently delete something that you shouldn't, please tell the person from whom you obtained the disks and manuals. He or she will make things right again.

Read the following , then proceed with all of Chapter 2.

Learning about the Ruler is important because the Ruler determines the format of your document. Margins, tabs, paragraphs, indentation—all these and more are controlled by the Ruler.

On p. 34 you are asked to make a duplicate of the document named Example 2. Rather than making a duplicate on the WriteNow disk, copy the document Example 2 to your own work disk, then re-name it. (Remember that the processes of copying and re-naming must be done at the Finder, or desktop. If you have already started WriteNow by double-clicking its icon, or by selecting its icon then choosing **Open** from the **File** menu, you must choose **Quit** to get back to the Finder.) If you have not yet learned how to make a copy from one disk to another, refer to p. 66 of the *Macintosh Plus* manual.

After you have made the copy, re-name the copy "Letter". You can then just double-click Letter to open it.

Read the following before going on to Chapter 3.

Chapter 3 of *WriteNow for Macintosh* deals mostly with headers and footers—putting text into the sections of the page that might informally be called the "top margin" and "bottom margin." Read this chapter selectively, attending only to what you feel you might need to know. Although it would be nice to know how to put page numbers into a header or footer when you are printing a document, strictly speaking—for the purposes of this course—you don't need to know how to do it, since the assignments you submit

electronically will not require pagination.

Read the following, then decide what you want to read next.

The remainder of the *WriteNow for Macintosh* manual is really designed for reference—you reach for it when you need to refresh your memory on how to do a certain thing. It might be worthwhile to simply flip through the rest of the manual, just to see what's there.

Note that the information on pages 92-93 about graphics (pictures) is valid, but in your assignments, you cannot make use of the Mac's ability to include pictures since they cannot be "mailed" electronically. Experiment if you wish, but remember to avoid putting graphics into your assignments. (Separate programs are required to produce graphics.)

On the other hand, you certainly can change fonts (see pages 26-27) and make characters bold or italic (pages 25–26) if you wish.

There are also parts of the *Macintosh Plus* manual that you might find worthwhile. Sooner or later, you should read (and do!) the pages of *Macintosh Plus* listed below, although the exact order and timing of when you read them is not critical.

- ❑ p. 31–37 (optional)
- ❑ p. 41–50
- ❑ p. 60–68
- ❑ p. 69–71
- ❑ p. 74–77
- ❑ p. 80–83

Ignore the comments in the second paragraph on page 80 about color. Disks come in a variety of colors, and the comments in the manual are accurate only for Apple brand disks. With other brands, you can't necessarily tell whether the disk is one-sided or two-sided by the color. The disks you have been sent as part of the course are two-sided, and should be initialized as two-sided.

The following pages review some concepts that you have already experimented with; you might want to use them to bolster your understanding:

- ❑ p. 101
- ❑ p. 105–107
- ❑ p. 117
- ❑ p. 120–126

The remainder of the *Macintosh Plus* manual can either be ignored or used solely as a reference.

If you choose to read about and try out things not specifically recommended by this document, please try to remember every step you do, so that you can undo them, and put things back the way they were when you are finished, so that the next student will be able to locate things as described.

If you inadvertently make a change that you can't undo, ask for assistance from another student or from the person who issued the disks and manuals to you.

Backups

To prevent the loss of your written work from floppy disks, due to the circumstances described above, or something else—like the dog chewing your disk, or the disk being erased by a strong magnet, or a cup of coffee being spilled over a disk—you should always, always, always make a backup (duplicate) copy of your disk.

With your course materials, you received two blank disks, which you will have to initialize in the manner described above and in the *Macintosh Plus* manual (indeed, you've probably done at least one already). You should also affix labels to the disks with your name and the name you have given the disk when it appears on the desktop (those two names could be the same, but needn't be). It might make sense to name one disk with your first name (e.g., Earl) and the other one with your initials and something to indicate the word "Backup" (e.g., EarlBkUp). When you are using WriteNow, save your documents on the Earl disk.

After you have done any significant amount of work, you should:

1. Quit WriteNow, and at the desktop, ensure that the window for the disk Earl is open.
2. Eject the WriteNow disk by first clicking on it to select it, then choosing **Eject** from the **File** menu.
3. Insert the EarlBkUp disk into the empty disk drive.
4. Drag the document you wish to back up from the Earl window to the EarlBkUp disk to make a copy of the document on the backup disk.

   The Mac may ask you to insert the WriteNow disk, then the EarlBkUp disk. The requests may be repeated. Just give the Mac the disk(s) it asks for and all will be well.

   Note that if you are using folders in either or both of your Earl and EarlBkUp disks, you will have to ensure that the document is dragged into the appropriate folder.
5. Eject the EarlBkUp disk, insert the Earl disk, double-click on the document you were working on, and proceed with more work.

You will note that the instructions above are stated in terms of "any significant amount of work". How much is significant? How often do you have to back up? The answer to those questions is another question: How much can you afford to lose if the unthinkable happens and you lose the document?

Fair warning: If you are like most people, you will forget to back up or just plain put it off until such time as you lose your first document or portion thereof. Then you will (temporarily) become more conscientious about doing backups, until complacency sets in again. (PERSONAL ASIDE: I have been using computers for many years, but still need to be rudely reminded about the importance of doing frequent backups about every 18 months or so, so if you do get caught, please realize that you're not alone!)

On the other hand, don't become so paranoid that you are doing backups every two minutes or so. It just isn't worth it. Many people consider every 20 or 30 minutes to be a reasonable length of time to go before backing up. Of course, if what you are doing is very complex or

irretrievable, you might want to back up more often.

Naturally, every time you finish a work session at the Mac, you should back up all the documents you used during that session.

The Care and Feeding of Floppy Disks

This topic really doesn't fit anywhere in particular, so we'll deal with it now. These are just a few do's and don'ts on how to handle and care for magnetic disks.

1. Try to avoid storing or carrying the disk in a dusty or lint-laden environment. If you carry the disk in your pocket, purse, or briefcase, put it inside a clean envelope first.
2. Do not touch the surface of the magnetic coating (located under the sliding metal flap).
3. Do not fold or bend the disk. The rigid plastic case of the disk is not as tough as it appears to be.
4. Protect the disk from magnetic fields. Some common field-producing objects in an everyday environment are: computer monitors; television sets; radios; electric motors; magnetic purse clasps; magnetized paper clip holders; telephone bells.

   Experience shows that the disks used with the Mac are quite resistant to problems originating from magnetic fields, but it's probably best not to take chances.
5. Store out of direct sunlight.
6. Avoid temperatures below +10° C for prolonged periods.
7. Avoid liquids in the vicinity of disks and computers. (Remember, no matter how bad you think a particular cup tastes, coffee is still a liquid!)
8. Avoid smoking in the vicinity of disks and computers. Because of the extremely close tolerances involved, a smoke particle on the surface of a disk appears boulder-sized to the magnetic head that reads that disk.

"Mailing" Your Assignment Electronically

In order to prepare your assignment for submission in electronic form, you must convert the assignment document with a program called Binhex5, then "mail" it electronically with a program named Kermit (yes, it is named after the Kermit from Sesame Street—but don't ask me why!). Kermit puts the binhexed document on the main computer on campus. Your instructor uses Kermit to move the document off the mainframe onto his or her own Mac, then uses Binhex5 to convert it to the same state as it was when you started the process. When the assignment is ready to be returned, you both go through the same steps again, in reverse.

As an analogy, pretend that you have a personal secretary (Binhex5) who wraps the assignment into a parcel that can be mailed, and another person (Kermit) who takes the package to the Post Office (the mainframe). At the other end, your instructor sends the assistant (Kermit, again) to the Post Office to pick up your package, then has the secretary (Binhex5) unwrap it. After grading your assignment and inserting comments into the document, the instructor has the secretary and assistant, respectively, wrap up the package again, and transport it to the Post Office. Finally, your assistant brings it home from the Post Office, then your secretary unwraps it so that you can read it.

The process is actually simpler than it sounds, and really doesn't take very long once you've done it a couple of times. The instructions below, if followed carefully, will assure that your document arrives in fine shape. You will have to read carefully, though, and follow instructions exactly. Computers are notorious for doing what you tell them to, not necessarily what you want them to.

The summary and check list on the following page serves as an overview, as well as a summary, of the process by identifying the steps that need to be done. It will probably not be very understandable to you the first time you read it over, but don't be concerned. The check list is followed by detailed instructions for each step, and after you've gone through the process a couple of times, the seemingly terse summary statements will be enough to remind you of what you need to do. Use it as a guide while you do your uploading (sending your documents to the mainframe) and downloading (retrieving your documents from the mainframe) to help ensure that you don't miss out any of the steps.

Summary and Check-List for Uploading and Downloading Documents

- ☐ 1. Prepare your assignment as a WriteNow document (called *Assignment 3* in the examples below).
- ☐ 2. Restart the Mac using the U of S Disk.
- ☐ 3. Binhex *Assignment 3*, making sure you re-name the document to 3.IN. [Steps 6–10]
- ☐ 4. Log on to the mainframe. [Steps 11–22]
- ☐ 5. Upload the document 3.IN. [Steps 28–35]
- ☐ 6. **Either**:

  (a) Do any other work you may wish to on the mainframe:

  - check your directory [p. 36]
  - use MAIL [p. 44
  - use VUCAT [p. 52
  - download a graded assignment [Steps 36–42]

  or

  (b) Log off [Steps 23–27]
- ☐ 7. If you did download a graded assignment, Binhex it and re-name it to *Assignment 3 - Graded*. [Steps 44–49]
- ☐ 8. Copy the document *Assignment 3 - Graded* from the U of S Disk to your own disk. [Step 50]
- ☐ 9. Clean unnecessary files off the U of S Disk. [Step 50]
- ☐ 10. Restart the Mac with the WriteNow disk, and read the instructor's comments on *Assignment 3 - Graded*. [Step 51]

Preparing Your Document with Binhex5

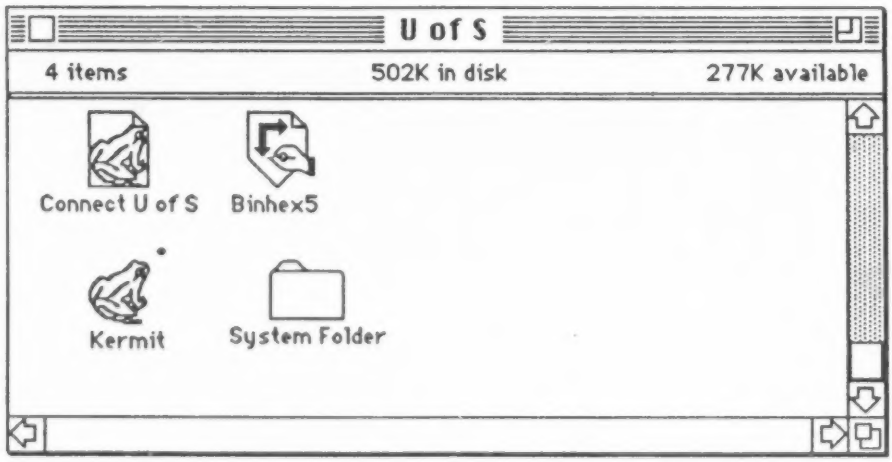
1. Prepare your document on WriteNow, as usual. Read it over on the screen to ensure that it is exactly the way you want it, then save the document on your own disk and quit WriteNow.

   One restriction: Although the *Macintosh Plus* and *WriteNow for Macintosh* manuals show you how to do it, you cannot include graphics in your document; only those things that can be produced by WriteNow will transport correctly.

   In the example below, the document you want to send to campus is named Assignment 3.

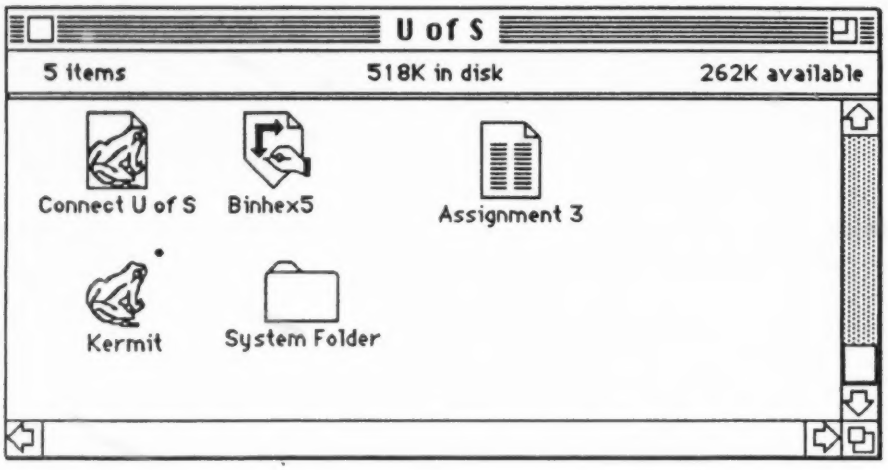
2. If you were just using WriteNow (or any disk other than U of S), choose **Restart** from the **Special** menu at the Finder, then insert the U of S disk in the internal drive. You can then insert your work disk in the external drive, if it is not already there.

3. Double-click the U of S disk to open the window if it is not already open. You should see the following icons, although not necessarily in the same relative positions:



4. If there are any icons other than those above in the window, drag them to the Trash; presumably they were left there by mistake by another student.

5. Copy your document (Assignment 3) from your disk to the U of S disk. The window for the U of S disk should contain the following documents when you are done with your copying.



6. Double-click the Binhex5 icon. The following notice will appear:

BinHex v5.0
by
Yves Lempereur

This new and improved version of BinHex is offered to you as shareware. Although a copyrighted program, you are encouraged to offer a copy of it to anyone who wants it. You may not modify or sell this program without express written permission of the author.

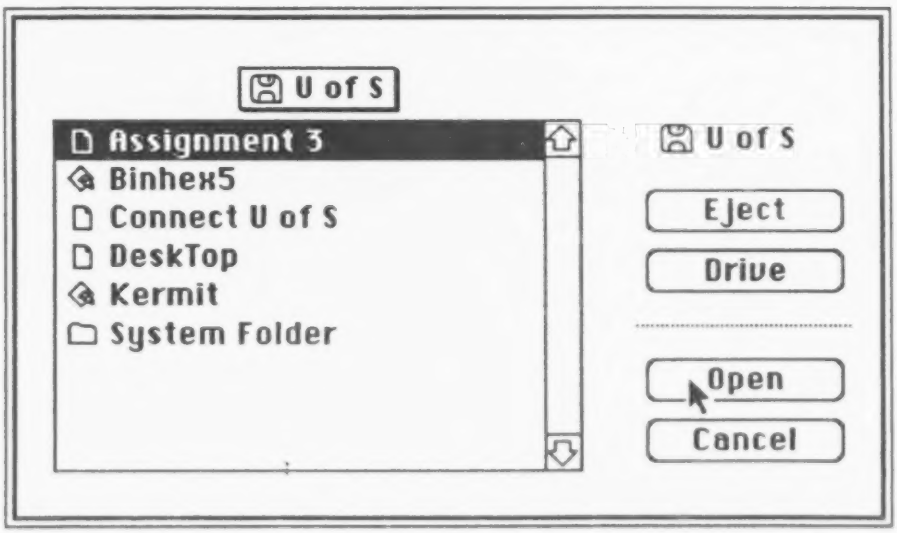
If you decide to keep and use this program, please send $10.00 to the author. Include your name and address to be advised on future developments. Your support will assure other high quality shareware utilities. Thank you.

Yves Lempereur
28611B Canwood St.
Agoura Hills, CA 91301
(818) 991-6540

You need not be concerned about the contents of the notice, since the University has already taken care of payment for use of the program.

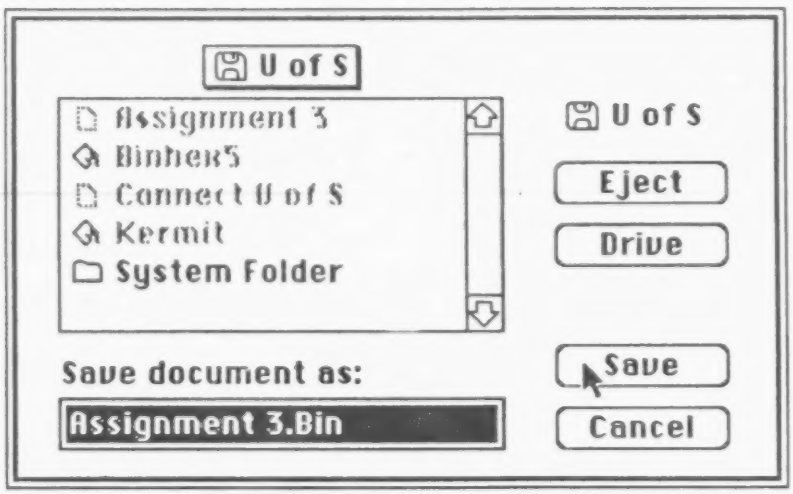
All you need do is click somewhere on the notice to proceed.

7. Choose **Application -> Upload** from the **File** menu. (Alternatively, use the keyboard shortcut by holding down the ⌘ key and typing the letter 'U'.) A display similar to the one on the following page appears:



The list of files and programs in the window may be slightly different, depending on what is on your U of S disk. You should search through the contents of the disk by using the scroll bars if necessary, until you locate the document you want to send (in this case, Assignment 3). Select (blacken) that document by clicking on it once, then click the **Open** button. (Alternatively, just double-click on the document name.)

8. The following display will appear:



Note that Binhex5 suggests a name with which you can save the document (Assignment 3.Bin). You can (and should) use a different name for the document now, however. Here's why:

Until now, you have been giving your documents names that are meaningful to you. However, the names that are meaningful to you may not be as meaningful to your instructor. Furthermore, if the name you assign is quite long, this creates extra work in the process of transferring files to and from the mainframe.

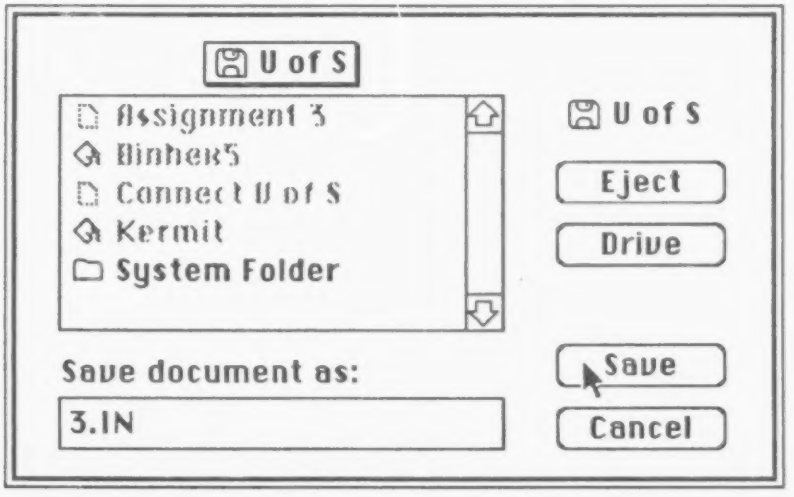
Therefore, we will establish a convention, and ask that all students use it: At this point in the process of "mailing" your document in, **change its name to consist of the assignment number, then a period (.), then the letters 'IN'**. Thus, Assignment 2 should be named 2.IN; Assignment W5 should be W5.IN.

When your instructor has read and commented on your work, he or she will change the 'IN' portion of the document name to 'OUT'. That way everyone concerned will be able to identify what assignment number it pertains to, and whether it is a graded or ungraded assignment.

To make the name change, type the new name in. Since the name that Binhex5 suggested (Assignment 3.Bin) is already selected (blackened), whatever you type will simply replace the suggested name.

If the name is not selected for some reason, you can select it (or any portion of it) by dragging over it just as you would when editing in WriteNow.

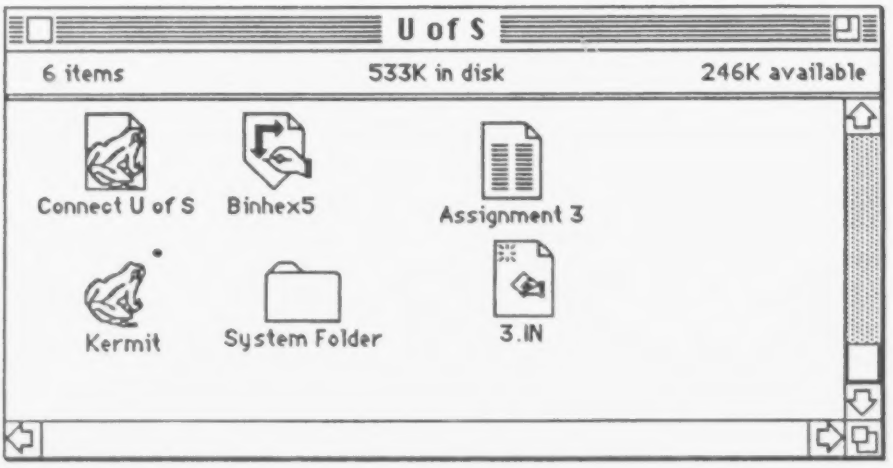
Change the name, then click the **Save** button.



9. A message will flash on the screen, indicating that the file is being converted. When the following message appears, it indicates that Binhex5 has finished doing its work:

File conversion successfully completed!

10. Choose **Quit** from the **File** menu. You will be returned to the desktop. You will notice that a new file, 3.IN, has been added to the U of S disk (see display below). It is that new file that you will Kermit to the mainframe.



Logging on to the Mainframe

At this point you must establish connections with the mainframe computer on the U of S campus—a process known as logging on—using Kermit. What you will be doing, in effect, is having your computer (the Macintosh) make a telephone call to the campus computer, via a device called a modem and the normal telephone system. One of the computers at your site (and probably only one) has the modem attached—a little beige or off-white box about 3 $^1/_2$" x 4" x1", with a couple of cords attached. You must use the Mac with the modem attached in order to communicate with the campus mainframe. **Please do not attempt to change the modem connections, or damage may result.**

Once the connection is established, you will "log on" to the mainframe (i.e., you will tell it who you are and prove your identity by giving it a secret password). Once you are logged on, you may proceed with whatever work you have to do—usually, for this course, it is simply uploading an assignment to your professor, or downloading one that the professor has graded.

When you are done with your work, you must "log off" the mainframe (i.e., tell it you are finished working and are disconnecting from it).

> If you don't log off, the computer will continue charging you for being connected.

Although the instructions below cover first logging on, then logging off, normally you would use Kermit to transfer your file to the mainframe in between logging on and logging off—how to do that is described after the section **Logging Off**.

In the instructions that follow, the symbol RET stands for a Return key. The mainframe has no way of knowing when you have finished typing in a command, so you have to "tell it" when you are done by pressing the Return key. If at some point below you find yourself waiting an inordinate length of time for a response from the mainframe, it might be that you have forgotten to press the Return key, and the mainframe in turn is waiting patiently for you to finish giving it a command. Make a conscious effort to type that RET every time you issue a command to the mainframe.

If, in the instructions, some punctuation appears after the RET symbol, that punctuation is *not* to be typed in.

To help you discriminate, what you must type is printed in ***italics***; what the mainframe prints on the screen is printed in **boldface**.

Just as the mainframe must be told explicitly (with a RET) when you have finished sending it a command, it will tell you when it is ready to receive a command by sending you a prompt—some word or symbol that says "I'm ready". The most frequent prompt you will see is **$**, but others will be described below, as well.

11. Double-click the Connect U of S icon. Note: You do **not** want the Kermit icon, but the Connect U of S icon (see below).

Kermit

Connect U of S

- If you accidentally double-clicked the Kermit icon, choose **Quit** from the **File** menu and start again.

(Connect U of S starts Kermit running, but it also sets certain required parameters properly.)

The next several steps must be done in fairly rapid succession, as the mainframe computer only gives you a certain (relatively brief) period of time to accomplish each step before it breaks your connection. I don't mean that you have to rush, but you should have a pretty good idea of what you must do next as you progress through each step; you probably won't have time to read each step, then do it.

You should read over steps 12–16 carefully, perhaps rehearsing them mentally before attempting them.

If, at any point, you get the message **NO CARRIER**, you will know you have waited too long, and you will have to start again. Usually, you can start again from step 12, but sometimes it may be necessary to **Quit** Kermit and start again from step 11.

If you're unsure whether or not you're ready to start again, pick up the telephone handset and check for a dial tone. If it's there, you can proceed. If it isn't, try hanging up again, or, if possible, typing ***at h*** in Kermit, then checking for the dial tone. If none of these works, you might try disconnecting the telephone cord between the modem and the telephone, then re-connecting it (you needn't turn the Mac off to do this). Make sure the connector is properly (snugly) inserted before attempting step 12 again.

A word of caution: if you type in the wrong phone number in step 12, you may hear a human voice answering; unfortunately, that human will not hear anything on the line. Obviously, repeated wrong numbers will not be well received.

Just to make things a little more complicated, the mouse is temporarily "disconnected" when using Kermit, so you cannot fix typos in the manner in which you have become accustomed. Furthermore, during step 12 the Backspace key does not work normally: You must hold down the ⌘ key while you press the Backspace key, in order to backspace.

12. When the window labelled MacKermit opens, type one of the following :

    at d 1-933-9400 RET if you are outside the Saskatoon dialing area;

    at d 933-9400 RET if you are in the Saskatoon dialing area.

    (You will recognize these as direct-dial long-distance and local telephone call numbers, respectively.)

    It doesn't matter whether you use upper case or lower case letters. It also doesn't matter whether you put in or leave out the blanks and hyphens, although putting them in may make it easier for you to read and/or to detect typing errors.

13. You will hear the modem dialling the number, then you will hear the number ringing once or twice, and finally you will hear a high-pitched continuous tone followed by some static-like sounds. The prompt **CONNECT 1200** will

appear. You're now connected to the campus system and ready to proceed.

If you get a wrong number and a human or recording answers, type **at h** to "hang up" the phone and try again, more carefully.

14. Type RET as many times as necessary to get the response

```
DECserver 200 Terminal Server V1.0 (BL20C) - LAT V5.1

Please type HELP if you need assistance

Enter username> _
```

- If you do RET 16 or 20 times without success, start again from step 12.

15. Type in the Username assigned to you (on the green sheet), followed by a RET.
    - If you make an error while you are typing it in, you can backspace using the Backspace key and correct it as long as you do so before hitting RET. If you don't realize that you made an error until after you hit RET, don't worry. The communications network may think you are someone else, but there's no cause for concern. Proceed merrily!

16. The computer should respond with **Local >** .

> Once again we are at a point where long pauses will not be tolerated. Steps 17–20 must be conducted with the same efficiency as steps 12–16.
>
> Before starting step 17, read ahead to ensure you know what to do next.

17. Type ***connect skyblu*** RET. Either upper or lower case characters are acceptable. Be sure to leave a space between the two words.

18. The computer should respond with a message similar to that at the top of the following page. (Sometimes the name SKYWAY appears in place of SKYRUS.)

```
Local -010- Session 1 to SKYBLU on node SKYRUS established

At the signpost up ahead ... SKYRUS

Username: _
```

- If you get the response **LOCAL -702- Keyword XXXX not known or ambiguous** (where XXXX is replaced by what you typed in) you probably forgot to type in the word ***connect*** or you misspelled it. Try again from step 17.
- If you get the message **LOCAL -711- Service XXXX not known** (where XXXX is replaced by what you typed in) you probably made an error typing the name ***skyblu***. Try again from step 17.
- If you get a message saying (approximately)

  Local -020- Logged out port 2 NO CARRIER

  you took too long typing in your Username and/or password. Try again from step 17.
- If you get the message

  Local - Service temporarily unavailable

  or something similar, the mainframe is "down" (i.e., inoperative). You will have to try again later.

19. Again, type in your Username, followed by a RET.
20. The computer will respond with **Password:** Type in your password, followed by another RET. Your password will not appear on the screen as you type it, for security reasons.
    - If you get a message saying

      User authorization failure

      you probably made an error typing in either your Username or your password. Simply type RET to get the **Username:** prompt again.
    - If you take too long (more than about five minutes) to type in the RET in response to a **User authorization failure** message, you will see the message

      Local -020- Logged out port 2 NO CARRIER

      If this happens, start again from step 12.
21. One or more system messages, which may change from one session or day to the next, will appear on the screen, followed by the **$** prompt. You may usually ignore these system messages, except insofar as they may forewarn you of times when the computer will be "down" (i.e., not available). Plan your use accordingly.

    You may also get a message indicating you have mail. If so, refer to the section **Using MAIL** later in this document.

Sometimes is takes several seconds for the $ prompt to appear, so be patient.

If the following message appears, just hit RET :

Terminal type [VT100]

22. Proceed with doing whatever work you need to on the computer (normally, using Kermit to transfer your file– for which instructions follow on the next page). When you are finished your work, you must log off.

Logging Off

It is not necessary that you log off now. Instructions for doing so are given at this point in the event that something interrupts your progress through the next section. Merely keep in mind where these instructions are, so that you can locate them easily when you need them.

23. At the $ prompt, type ***log*** RET
24. The computer will respond with your user name and a logout message:

```
   MISANCHUK     logged out at 23-NOV-1988 10:50:05.97
Local -011- Session 1 disconnected from SKYBLU
Local>
```

25. Type ***log*** RET again. The response will be something similar to:

```
A*cal -020- Logged out port 2
NO CARRIER
```

You are now completely logged off the campus mainframe.

Redundant as it sounds, you *must* type ***log*** twice– at step 23 and again at step 25.

26. Type ***at h*** RET to "hang up the phone" and clear the line.
27. Choose **Quit** from the **File** menu; you will be returned to the desktop.

Using Kermit to Upload Your File

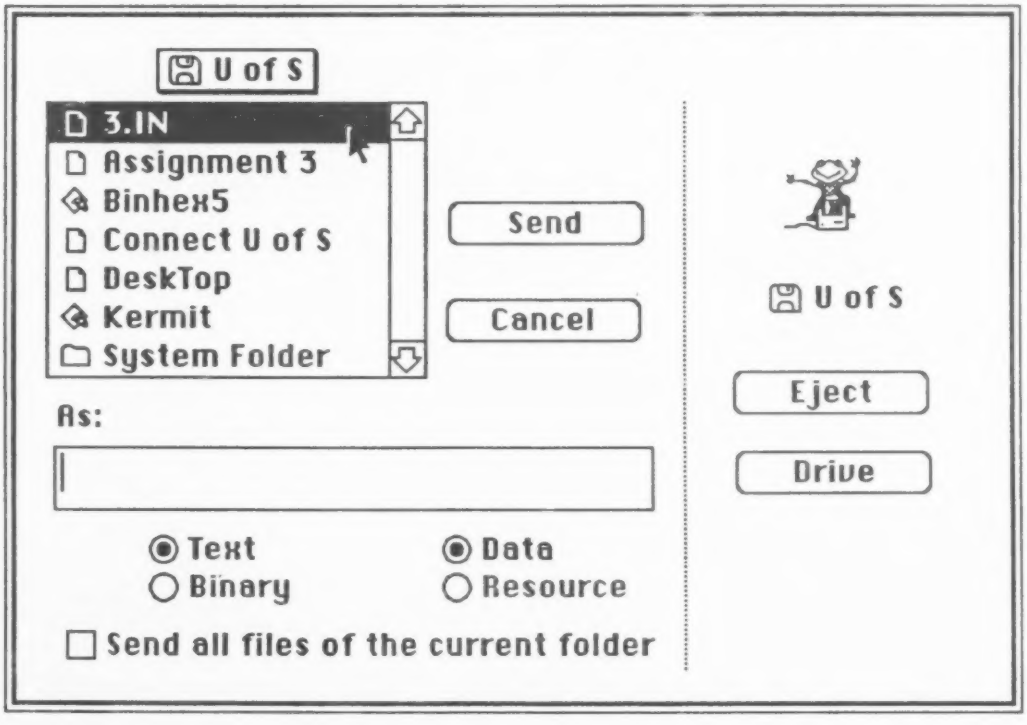
28. At the **$** prompt, type ***kermit*** RET. The reply is something resembling:

VMS Kermit-32 version 3.3.111
Default terminal for transfers is _VTA7192:
Kermit-32>

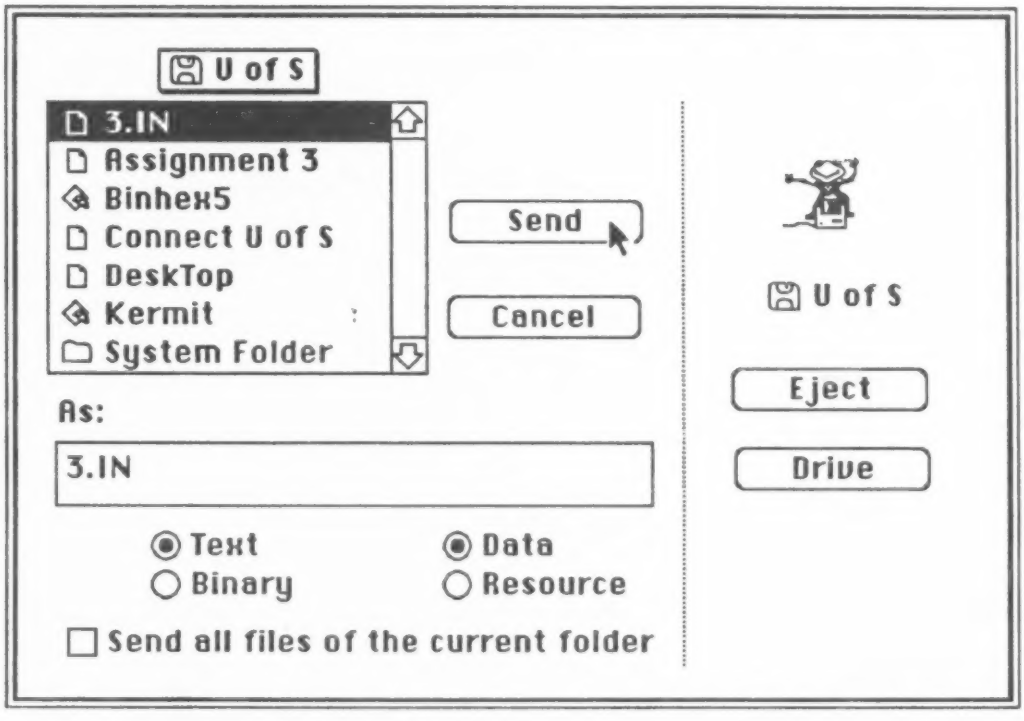
The numbers may be somewhat different, but the message should have the same general form.

29. Type ***server*** RET. There will be a three-line message which you needn't bother reading, and probably won't make any sense out of if you do.

30. Choose **Send file...** from the **File** menu. The box on the following page should appear, although the contents of the scroll box may be slightly different:

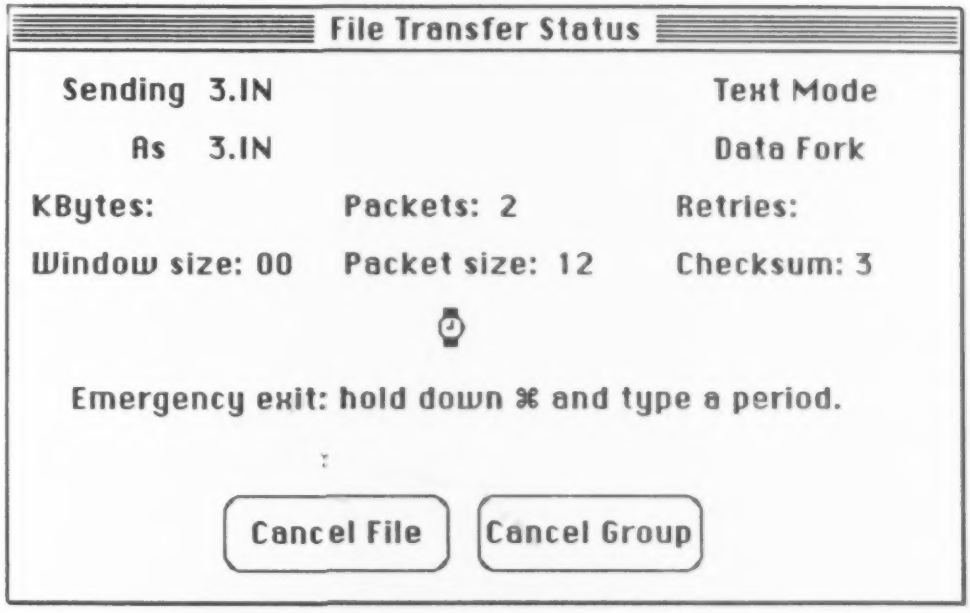


31. Click once on the file you want to transfer (3.IN in the example) to select it. The name of the file should appear in the blank box where the cursor was:



Alternatively, you can type in the name of the file, rather than clicking on it. The important thing is to get the complete and correct file name into the box below the **As:**

32. Click the **Send** button. The following box will appear:



The number of KBytes and Packets will change as the file is being transferred. Eventually, the message **Transferred OK** will appear in the box and the Mac will beep.

Although the wristwatch will remain on the screen (the result of a bug in Kermit), the job is done when the **Transferred OK** message appears, so watch for it.

If the **Transferred OK** message does not appear, or some other message appears, click once anywhere on the screen, then go back to step 30 and repeat.

33. Choose **Finish** from the **Remote** menu.

34. Wait a few seconds until the wristwatch turns into an arrow, then do a RET. The prompt **Kermit-32>** will appear.

35. Type ***quit*** RET . The **$** prompt will appear. You are now ready to log off, unless you want to retrieve one or more files that have been graded, or read MAIL, etc.

    Please log off pomptly when done to avoid unnecessary long-distance charges.

Checking Your Directory

The mainframe keeps a directory of all the files you have in your account. You need to consult the directory to determine whether your professor has deposited a graded assignment in your account. If he or she has, then you can retrieve the document by downloading it with Kermit.

In order to check your directory, simply type ***dir*** RET while you are at the **$** prompt. All the files in your account will be listed. Notice that all the files have the general form

FILENAME.EXT;n

where

FILENAME is the name of the file,

EXT is the file name extension,

n is the file generation number.

You need not pay too much attention to the file generation number; the file name and extension will suffice.

If you see a file whose extension is OUT, you should retrieve it.

If you want to see *only* those files in the directory whose extension is OUT, type ***dir *.OUT*** RET.

Using Kermit to Retrieve a File

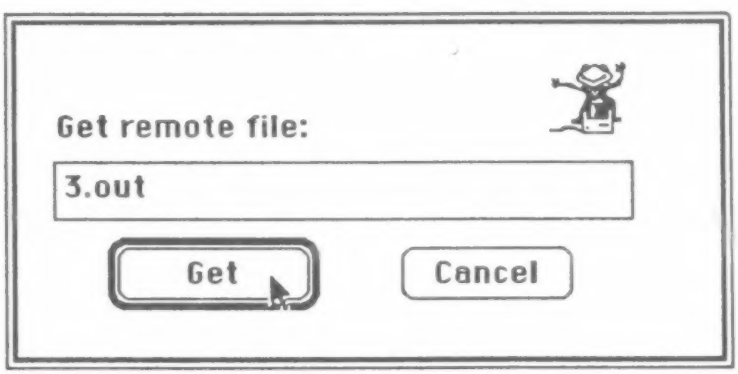
36. Perform steps 11 - 20 if you are not already logged on, then check your directory to determine the name(s) of the file(s) you want to retrieve.

37. At the $ prompt, type ***kermit*** RET.

38. Type ***server*** RET. This message will appear:

```
Kermit Server running on VAX/VMS host.  Please type your escape sequence to
 return to your local machine.  Shut down the server by typing the Kermit BYE
 command on your local machine.
```

39. Choose **Get file from server...** from the **File** menu. The following box should appear:



Type in the file name 3.OUT (again, upper and lower case letters work equally well; don't forget the period).

40. Click the **Get** button. Kermit will proceed to transfer the file from the mainframe to your Mac.

    You will get a display similar to that in Step 32, except that the file name will be 3.OUT rather than 3.IN.

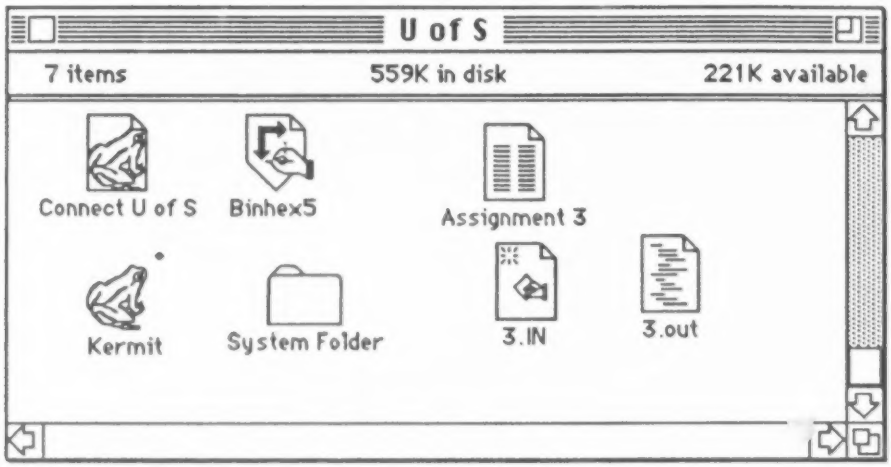
- If you get an error message indicating that the file can't be found, check for a typing error, click once anywhere on the screen, and re-do steps 39-40.

41. When the **Transferred OK** message appears, repeat steps 39–40 for additional files, or select **Finish** from the **Remote** menu. Wait till the wristwatch turns back into an arrow, then hit RET.

You should get the **Kermit-32>** prompt.

42. Type ***exit*** RET. You should get the **$** prompt. You may now log off, unless you want to do other things on the mainframe.

43. Assuming you did log off, choose **Quit** from the **File** menu. You will be returned to the desktop, and the window of the U of S disk will contain a new file—the one that was retrieved (3.OUT):

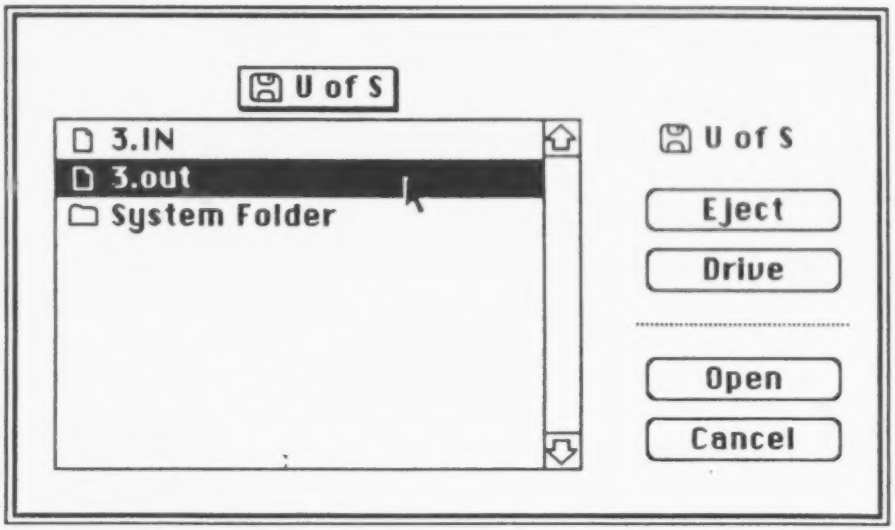


Binhexing a Downloaded File

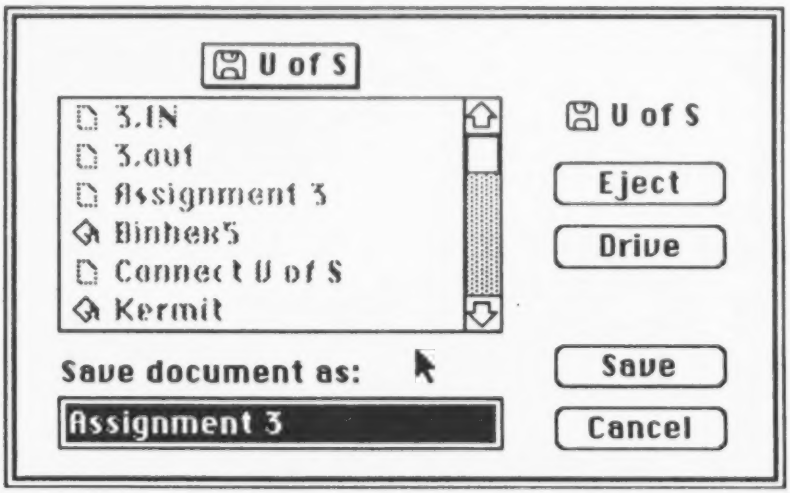
Now that you've Kermitted your file back to your own Mac, you must once again Binhex it to make it readable as a WriteNow document. (In the analogy, you must unwrap the package.)

44. Double-click the Binhex5 icon. When the notice appears, click anywhere on the screen.

45. Choose **Download -> Application** (⌘D) from the **File** menu. The display on the following page will appear:



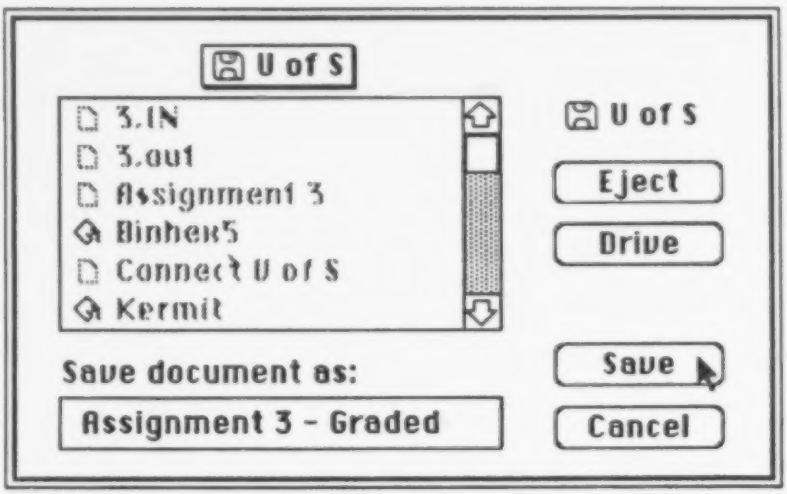
46. Select (blacken) the file you want to Binhex (3.OUT in the example), then click the **Open** button. (Alternatively, double-click the name of the file.) This display will appear:



47. Note that the name Assignment 3 is selected (blackened), allowing you to replace it immediately by simply typing the name you want. You need to choose a name that is different from Assignment 3, because if you didn't, when it came time to copy this document on to your own disk, the new (graded) document would replace the original (ungraded) document since they have the same names.

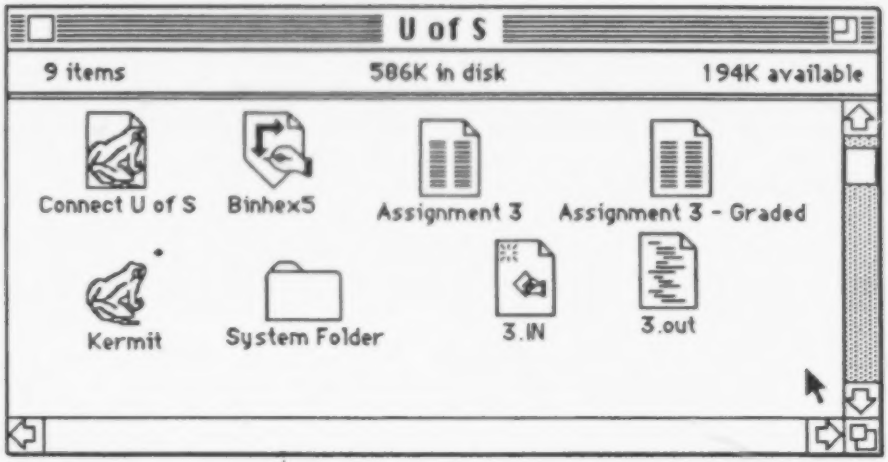
In the example, the name is simply extended, to become Assignment 3 - Graded.

By typing in the name, you will make it look like the display on the next page.



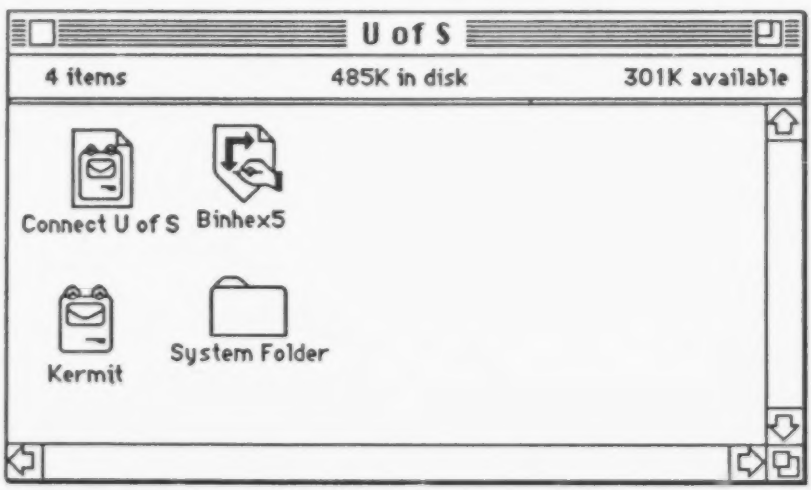
48. Once again you will get a message indicating that the file is being Binhexed, and finally this message will appear:

49. Choose **Quit** from the **File** menu. When you return to the desktop, you will see the newly-downloaded file as a WriteNow document, named Assignment 3 - Graded (see figure on next page).



You will, of course, want to read the instructor's comments on your assignment. In order to do this, you will need to copy your document to your own work disk, and switch from the U of S disk to the WriteNow disk.

50. Copy Assignment 3 - Graded (the WriteNow document) onto your own disk, (and, for extra safety, make a second copy onto your backup disk), then drag all of your documents from the U of S disk (i.e., Assignment 3, 3.IN, 3.OUT, and Assignment 3 - Graded) into the Trash, so that they don't accumulate on the U of S disk and inconvenience other students. When you are done, the U of S disk window should contain only the following icons, although not necessarily in the same arrangement:



51. Choose **Restart** from the **Special** menu in order to start up again with the WriteNow disk.

By the way, if you are ever confused as to which document is which, pay attention not only to the name, but to the icon as well.

WriteNow documents have this icon:

Assignment 3

Assignment 3 - Graded

Inbound (to the University) Binhexed documents have this icon:

3.IN

Outbound (from the University) binhexed documents have this icon:

3.out

What To Do If Things Stop Working

On rare occasions, some problem with the telephone system may cause the message **NO CARRIER** to appear on your screen, and the mainframe will no longer respond to your command. What has happened is that for some reason or other, the phone connection between the Mac and the mainframe has been broken. To re-establish connection, simply do the following steps.

Please read through the following instructions before beginning to execute the steps, as there is one point at which relatively quick reaction is important.

52. Repeat steps 11 - 20 to log on again. When the logon process is completed, you will see the message below.

You have the following disconnected process:
Terminal Process name Image name
VTA7342 USERNAME (none)
Connect to above listed process [YES]:

The numerals may vary somewhat, but the general form of the message will be the same. Your Username will appear where USERNAME is above.

53. Give a RET here, within about 10 seconds of the appearance of the message, and you will be reconnected normally.

    - If you take too long, you will see a timeout message and you will be logged on again (i.e., twice). If you suspect that you may be logged on twice, type ***show users*** RET, and watch the list of user names that scrolls over the screen (you may have to be fairly quick to catch it). If your user name *is* listed twice, log out normally, then repeat steps 11 - 20, then step 52, giving the RET called for in this step more quickly this time.

Using MAIL

MAIL is a program on the mainframe that is used to send messages to one or more users at a time. With MAIL, you can ask your professor or another student a question (or answer one), or make a comment to one or more people simultaneously.

When you MAIL a message to another user, the message is retained on the mainframe, and a message is generated to the recipient. If the recipient happens to be logged on at the time the message is received on the mainframe, a notice saying **New mail on node SKYRUS from Username** appears on the screen of his or her terminal or micro. If the recipient is not logged on at the time, a similar message is displayed when he or she next logs on.

Thus, you can send a message to a person who may not be physically present at the time you send it, with confidence that the message will be received (and presumably responded to) the next time the recipient logs on. The same, of course, is true for the reply. It certainly beats playing "telephone tag".

We encourage you to use MAIL to communicate with your professor and with other students.

Here's how it's done:

1. At the **$** prompt (after you've logged on), simply type *mail* RET. The response should be the prompt **MAIL>**.
2. Your options at this point are (basically) to send a message, or to read a message. We will assume for the moment that you have been notified (at the time you logged on) that there is some mail for you, and you wish to read it now.

At the **MAIL>** prompt, enter ***read***. (Although RET's will no longer be shown, you must include them after each command entered.) The first unread message will be displayed on your screen. If the message is longer than the screen can hold, you will be told that the message is continued, and that you can see more by pressing the RET key.

After you have read the first message, you can read additional new messages if there are any. Simply press the RET key to advance to the next new message.

The messages are numbered. If you want to go back and read any particular message, you can simply enter ***read n***, where *n* is the number of the message you want to read. Thus if you received three messages one day and you wished to re-read the second, simply enter ***read 2***.

All messages that you have already read are stored (at the moment that you leave the MAIL program), so that you can go back to them later if you wish. You can see them all just by entering ***read*** when you first enter MAIL and there are no new messages waiting. To clarify: If there are new messages waiting, and you type ***read***, you will see only the new messages. If you want to see old, stored messages, you must exit the MAIL program by entering ***quit*** at the **MAIL>** prompt, then re-enter ***MAIL*** at the **$** prompt. You will be put back into MAIL, and this time, all your messages will be "old", so the ***read*** command will cause you to start reading the very first

message ever received in your account. The "new" messages—the ones you just received today—now have different, higher numbers among the "old" messages, so to re-read the first of today's messages you will have to find out what its number is. An easy way to zero in on the message you want is to enter ***read 999***. This will cause the last message to appear on the screen (assuming that you have fewer than 1000 messages). By observing its number, you can count backwards to find the message you want.

3. One way to ensure that you don't end up with many messages cluttering up your "old mail" file is to delete them as you read them if you don't want them saved.

   To delete a message, enter ***delete*** while you are reading a particular message, or else enter ***delete n*** (where *n* is the message number) at the **MAIL>** prompt.

   For example, if you just read message #3, and decide that you don't want to keep it, enter ***delete***.

   If, after reading message #4, you decide that you want to delete message #3, enter ***delete 3***.

4. Another option open to you while reading mail is to save the message as a WriteNow file on your Macintosh. You might especially want to do this if the message is quite long or if you will want to refer to it often and would like not to have to log on in order to do so.

   The procedure for doing this is not very complicated, but does take a while to explain. If you don't anticipate needing to do this activity, skip this section, and resume reading at point 5 below.

   While reading the message in question, enter ***extract***. The prompt **_File:** will appear.

   Enter a name for the file to be saved. The name should be short (no more than about 10–12 characters), and should contain no blanks or slashes.

   Be careful not to use a name of a file that already exists in your mainframe account, or the new file will replace the original. After you enter the file name, a message similar to this, but incorporating your Username and the file name you specified, will appear:

PUB5: [USERNAME]FILENAME.TXT;1 created

Use Kermit to download the file to the Mac, in the same way as you would download (retrieve) a Binhexed WriteNow file (see p. 34). Notice that in the message just above, the mainframe added the suffix **.TXT;1** to your filename. You must tell Kermit about the **.TXT** part, but it doesn't care about the semicolon or the number following it. That is, as far as Kermit is now concerned you have to tell it to get ***FILENAME.TXT*** from the server. If you get a message saying
file not found for FILENAME
it's probably because you forgot the period or the TXT.

It is not necessary to Binhex a downloaded mail file once you get it onto the Mac.

Restart after Kermit, start WriteNow, then use **Open** in the **File** menu to open the downloaded mail message.

5. If you want to quit MAIL, enter ***quit*** or ***exit*** at the **MAIL>** prompt.

6. Assuming you wish to send a message to someone, type ***send*** at the **MAIL>** prompt.

   The prompt **To:** will appear.

   Enter the Username of the person to whom you want to send the message. If you want to send the message to several people, you can do it all in one step by putting a comma after the first Username, then adding the additional Usernames, separated by commas.

   If you want to keep a "carbon copy" of the message, send it to yourself as well as to the other person: Follow the other person's Username with a comma and your own Username.

7. The prompt **Subj:** will appear. This prompt permits you to give your message a title, which you can enter. If you don't need or want a title for the message, simply enter a RET.

   This prompt will appear:

Enter your message below. Press CTRL/Z when complete, or CTRL/C to quit:

---

8. Enter your message, being sure to put a RET at the end of each line. MAIL is a rather "stupid" program, and does not do word-wrapping like most word-processing programs do.

   If you forget to enter a RET on one line, don't worry; a RET at the end of the next line will probably take care of it. It is good practice, however, to get into the habit of entering a RET at the end of each line of the message. Three lines to a carriage return is pushing it—part of the message may not get transmitted.

9. When your message is complete, do ⌘-**Z** (i.e., hold down the ⌘ key and press **Z**; the ⌘ key on the Mac is equivalent to the Control, or CTRL, key on most terminals). The message **"EXIT"** should appear, indicating that the message has been sent.

   If you sent yourself a "carbon copy", you will be notified as soon as you enter ⌘-Z that there is mail waiting for you, by the appearance of the message on the next page followed by the time in parentheses. The mail, of course, is your "carbon copy".

New mail on node SKYRUS [or SKYWAY] from YOURUSERNAME

Press RETURN to return to reading your mail.

10. If, at any point before doing the ⌘-Z, you decide that you want to cancel the message (i.e., not send it), simply enter ⌘-C. The response ***CANCEL*** followed by **No message sent** should appear.
11. If you are done using MAIL, get back to the **$** prompt if necessary (*exit* if you are at the **MAIL>** prompt), then log off (p. 30). Choose **Quit** from the **File** menu to leave Kermit.

    (Remember to do a **Restart** from the **Special** menu if you are going to begin using WriteNow.)

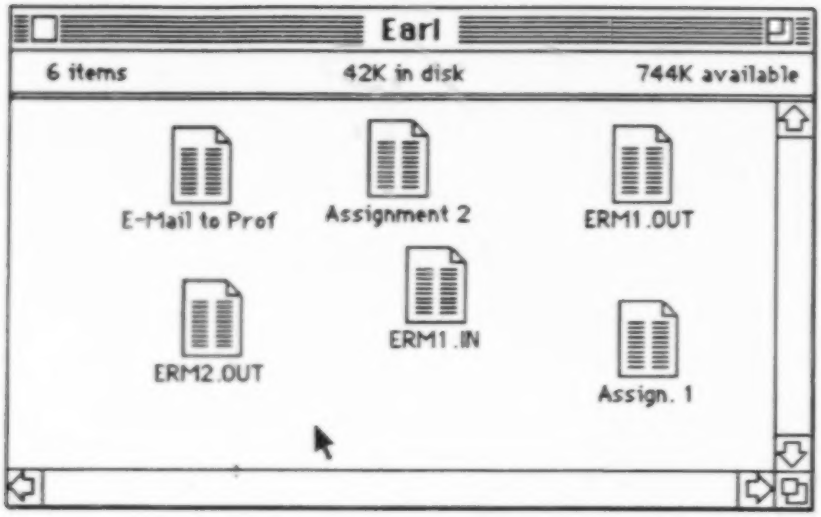
Preparing Long Messages for MAIL

Because MAIL does not support word-wrapping, and because editing on the mainframe would necessitate your learning to use a program called an editor (a kind of rudimentary word processor), it might be convenient for you to use WriteNow to compose messages that are of paragraph length or longer.

The instructions below reflect the several phases in converting WriteNow documents for MAILing. First you prepare your document on the Mac, using WriteNow. Then you have to convert the WriteNow document to something called an ASCII (pronounced **Ass**-key) document. Third, you transfer the ASCII document to the main computer. Fourth, you use the MAIL program on the mainframe computer to send your document to your professor or classmate.

1. Assuming you have prepared your message as a WriteNow document, you must convert it to an ASCII file using the Translator program on the WriteNow disk.

   Assume we have the following documents on your disk, and you want to send the document "E-mail to Prof" to your professor.

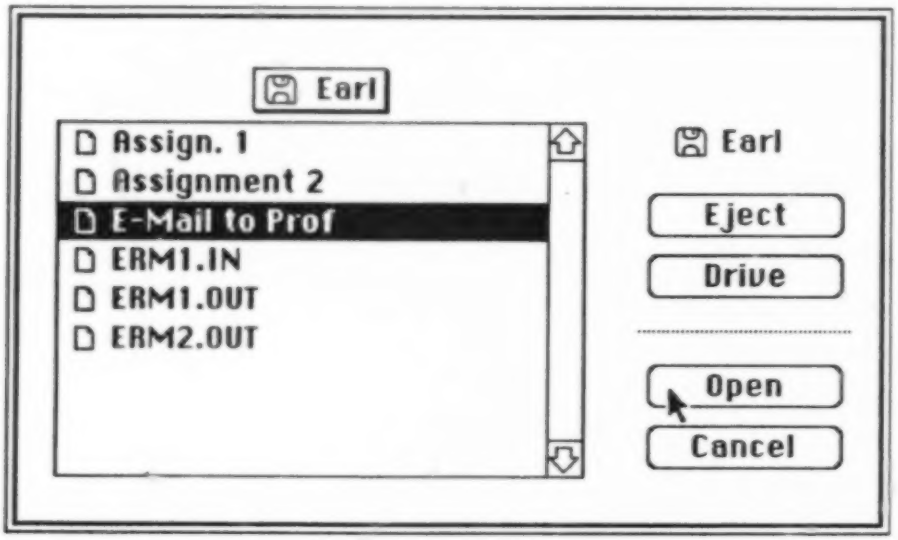


2. Double-click the Translator icon (below) to start the program.

The screen will clear except for the menu bar.

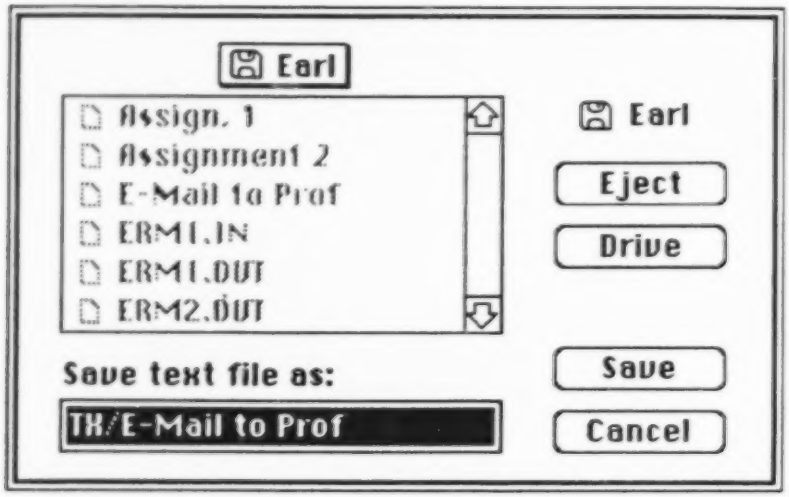
3. Choose **WriteNow to Text...** from the **Convert** menu.

4. When the window opens, click **Drive** until you see the disk on which the the document you want to send is located.



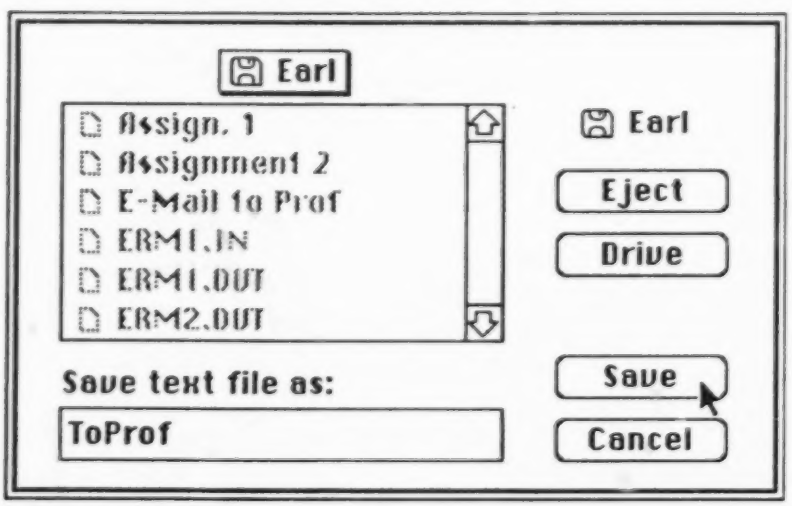
5. Click the name of the document to select it, then click **Open**.

The following window appears:



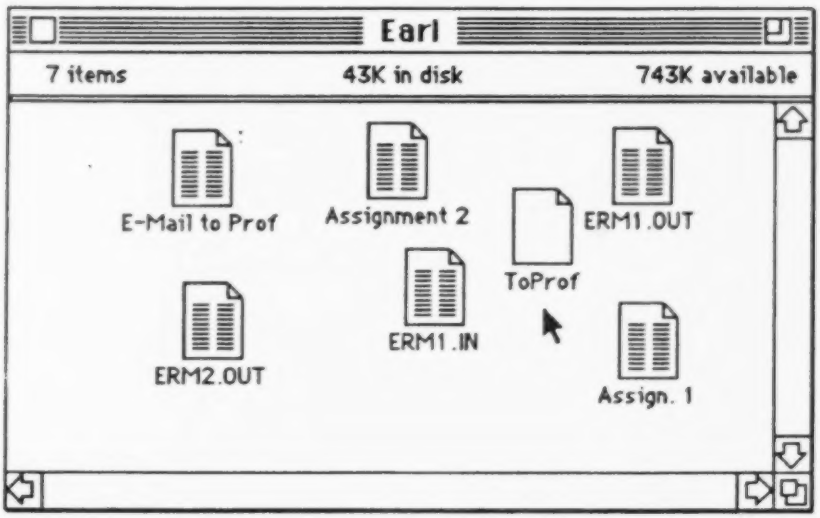
Note that the name "TX/E-Mail to Prof" is being suggested for the ASCII file that will result. Since this is a name that is quite long and has a slash and spaces in it (all of which will make the main-frame unhappy), you should change it to something short, and having no spaces or characters other than letters or numbers.

6. Type in an alternate name for the ASCII file, then click **Save**.



7. The screen will show a document window which will progressively become black. After a few seconds (depending on the length of the document) the screen will clear, showing only the menu bar once again.

Choose **Quit** from the **Convert** menu. You will be returned to the Finder, and you will note the existence of the newly-created ASCII document on your disk (see diagram on next page).



8. Use Kermit to transfer the ASCII file (TOPROF) to the mainframe in the normal way. (Remember to do a **Restart** from the **Special** menu when changing from WriteNow to the U of S disk.)

   Binhexing is not necessary prior to the transfer.

9. To mail the document to your professor, enter ***MAIL*** at the $ prompt, then enter

send filename

at the **MAIL>** prompt. For example, to send TOPROF to a professor whose Username is THOMPSON, enter

send toprof.

(Don't forget to put the period in, because the mainframe adds that period to the file name, and will complain if you don't put it in.

If you get a message saying

Error opening PUB5:[USERNAME]TOPROF.TXT; as input
File not found

it is probably because you missed typing in the period. (A typo in the name of the file will cause a

message that is similar in appearance.) Try again.

10. The **To:** prompt will appear. Enter your prof's Username (***thompson*** in the example). If you want to mail a copy to yourself, and/or to someone else as well, follow the first Username with a comma, then additional Usernames, separated by commas.

11. The **Subj:** prompt will appear. You may use it to apply a title to the message, or skip over it by hitting RET.

12. When the **MAIL>** prompt reappears, the message will have been sent.

13. To cancel sending the message, type ⌘-C anytime prior to the RET in response to the **Subj:** prompt. The message ***CANCEL*** followed by **No message sent** should appear.

Using VUCAT

VUCAT is a program on the University of Saskatchewan Library's Geac 8000 computer that allows patrons to search the catalogue electronically. By using Kermit to gain access to VUCAT, you can determine whether or not particular library materials (books, periodicals, etc.) are part of the holdings of the U of S Library, whether or not they are currently in the stacks, when they are due back if they are not in the stacks, which Branch Library they are in, etc. Armed with that information, you could phone in to have the materials mailed to you. Check the *Student Information Handbook* that was sent to you with your course materials for details on getting Library books through the mail.

The service is available 23 hours a day, seven days a week. Scheduled downtime is 7:00–8:00 am daily for system maintenance.

You may search the electronic catalogue in a variety of ways:

- by the book's title (or journal title, series title, etc.),
- by the author (or illustrator, editor, organization, etc.),
- by a combination of the author and title,
- by subject (according to Library of Congress subject headings),
- by call number (or ISBN, ISSN, ISRN, or Library of Congress number), or
- by key word.

To connect to VUCAT, perform Steps 11–22 in the **Logging on to the Mainframe** section of the *Orientation to Using a Microcomputer As a Distance Education Communication Tool (Please Read Me First)*. Then do the following:

1. Enter ***connect lib*** RET RET. Note that you must enter **two** carriage returns.
2. Depress the CAPS LOCK key (above the left Shift key). The Geac 8000 likes uppercase letters only.
3. A NEWS screen will appear on which there may or may not be messages of interest to you. The NEWS screen concludes with the prompt **Press CARRIAGE RETURN to continue**. Do so.
4. The screen display at the top of the next page will appear.

```
121 Main Library              - GEAC LIBRARY SYSTEM -  ALL *CHOOSE SEARCH

 What type of search do you wish to do?

        1.    TIL - Title, journal title, series title, etc.

        2.    AUT - Author, illustrator, editor, organization, etc.

        3.    A-T - Combination of author and title.

        4.    SUB - Subject heading assigned by library.

        5.    NUM - Call number, ISBN, ISSN, etc.

        6.    KEY - One word taken from a title, author or subject.
                :

Enter number or code, then press CARRIAGE RETURN
```

5. Whatever your choice, you will be presented with additional instructions and prompts. Most commands are listed right on the screen, but if you want a succinct summary of the commands available, refer to the orange-colored brochure on VUCAT that was sent along with all your other course materials. Ignore the second and third pages of the brochure in favor of these instructions, but make use of the command summary on the back.
6. If you enter a number or code and press RET, but don't get a response within a reasonable length of time, check to see that your CAPS LOCK key is locked in the down position.
7. Note that if there is no carriage return from your keyboard for three minutes, the Geac 8000 will issue the message

WARNING: SIGN-OFF IN 10 SECONDS IF INPUT IS NOT RECEIVED.

If you do not send any data to the computer within 10 seconds of the appearance of that message, you will be automatically disconnected from the Geac. This feature prevents terminals or micro-

computers that are not actively being used from tying up the system. It means, of course, that you must be well-prepared for the session, so that you know what you want to do next.

8. To quit using the electronic catalogue, enter ***TCP*** at any point. When the **LAT>** prompt appears, enter ***LOGOUT***.
9. Choose **Quit** from the **File** menu to exit Kermit.

Please feel free to use the electronic catalogue to search for materials that will help you with your course. Remember, however, that you are effectively conducting a long-distance telephone call all the time you are doing it, so please conduct your search as efficiently as possible.

Appendix F

Supervisors' Trouble-shooting Guide

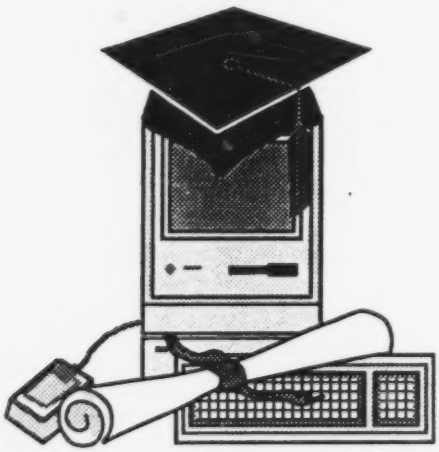
(Emergency Survival Kit)

Note: Pagination in this appendix corresponds to that in the original document.

Supervisors' Trouble-shooting Guide

Earl R. Misanchuk, Ed.D.
Professor of Extension
University of Saskatchewan

Emergency Survival Kit



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Introduction and Table of Contents

This document is a grab-bag of potential (but somewhat unlikely) problems and their solutions. On rare occasions you will see a dialog box on the screen of the Mac that doesn't seem to have been covered in the instructional materials or manuals. We have reproduced some of them here, and provided instructions on how to cure the problems that caused them.

Because these problems arise so infrequently, there seemed no point in spelling them out for learners; indeed, supervisors shouldn't really expect to know how to deal with them without assistance from this document.

Perhaps the best way to make use of this document is to skim through it without trying to remember any of the instructions, but rather simply looking at the dialog boxes they deal with. That way, if you or a learner should encounter one of these dialog boxes, you might remember seeing it in this document. You can then flip through the pages until you find it, and read about the cure.

The table of contents is here to help you find something quickly, but because it is sometimes difficult to relate an entry in the table of contents to the actual problem or dialog box, you shouldn't rely solely on the table of contents.

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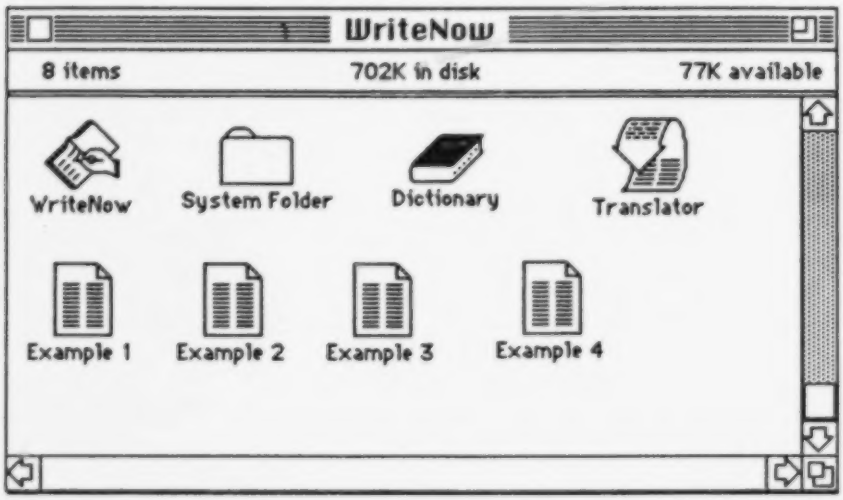
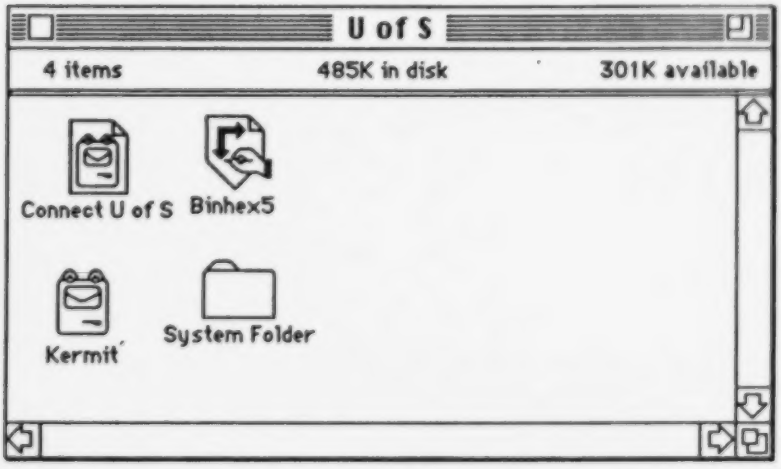
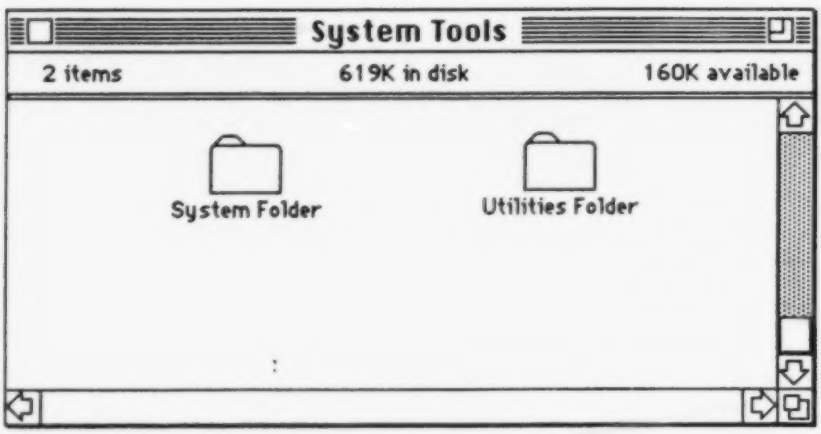
Below are the windows that can be opened for the three disks involved. If any of the disks does not have what is shown below, you should use the corresponding Backup disk to correct the deficient disk. The simplest way to correct a deficient disk is to copy the Backup disk onto the deficient one. (Make sure you do a **Restart** and insert the Backup disk first.) This does take a little time, however. If you need to copy only one file or document to make the deficienct disk whole again, it is probably more efficient to simply drag the icon from the Backup disk to the deficient disk (i.e. simply copy the one file).

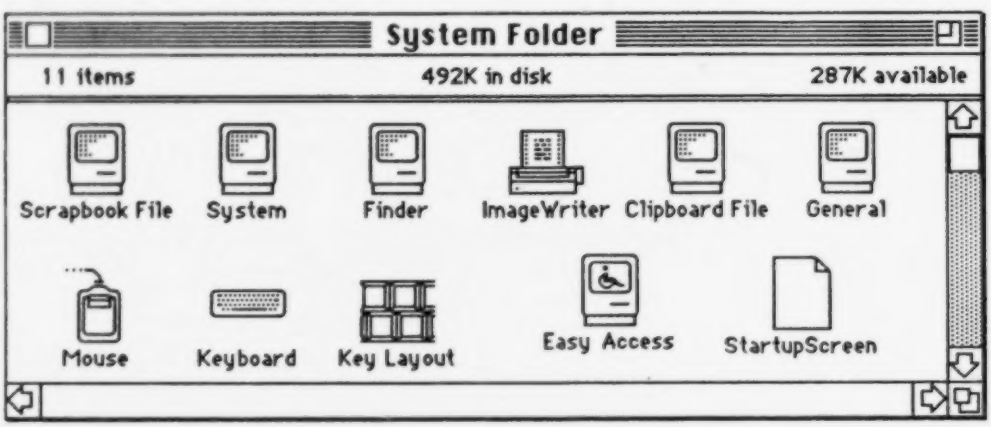
Keep an eye on the number of items in each window, as listed in the upper left of each window; some files may require considerable scrolling to bring them into view. Alternatively, change the **View** to **Name**, and do your cross-checking that way.



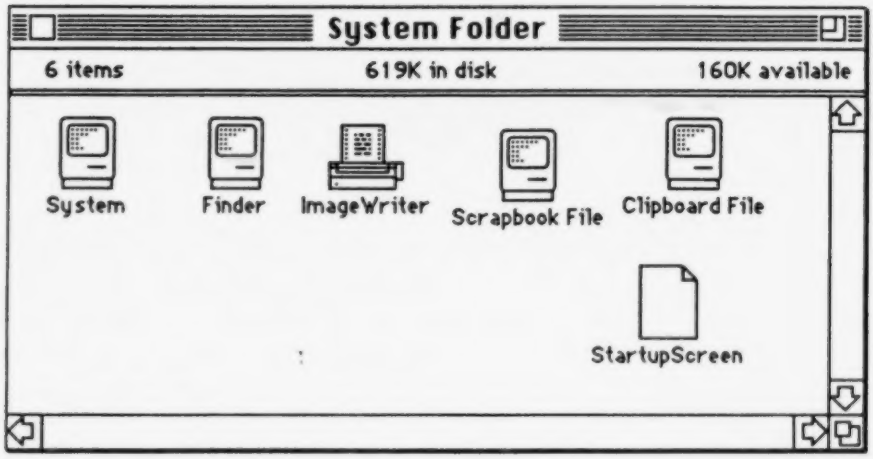




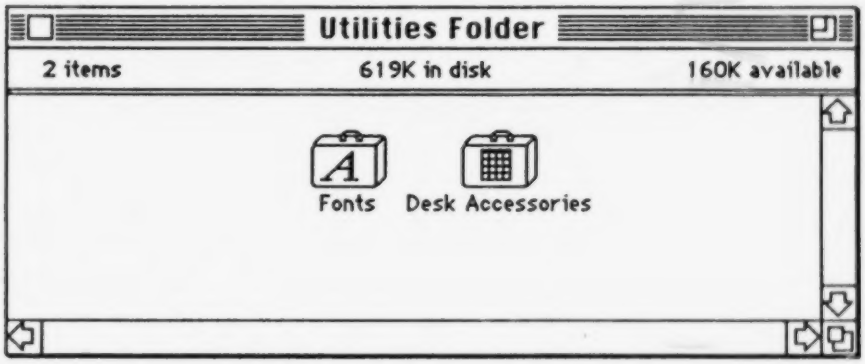
Below are the contents of the System Folders for both the WriteNow and U of S disks:



These are the contents of the System Folder for the System Tools disk:

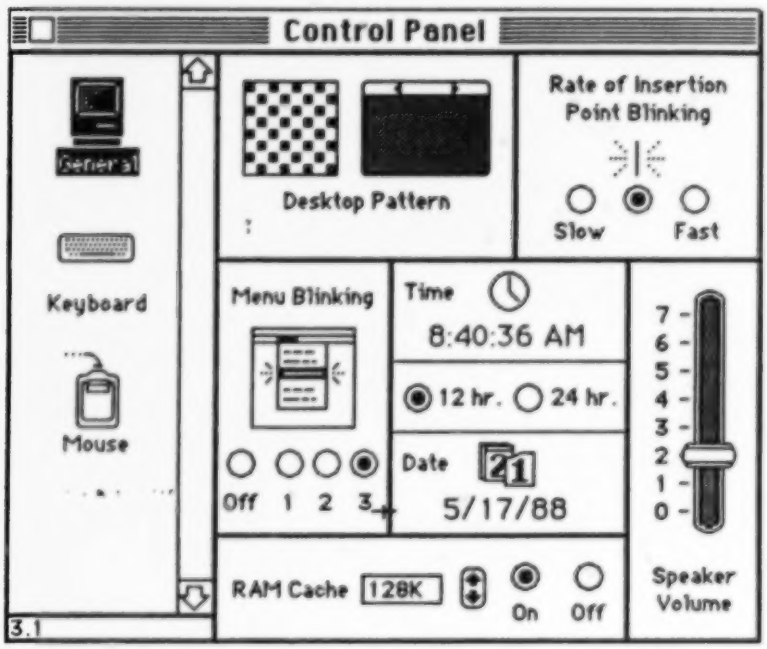


These are the contents of the Utilities Folder on the System Tools disk:



The Control Panel adjusts various settings on the Mac (loudness of the sound, the speed with which the cursor blinks, the ease with which the mouse moves, etc.). You get at the Control Panel by selecting it from the ♦ menu.

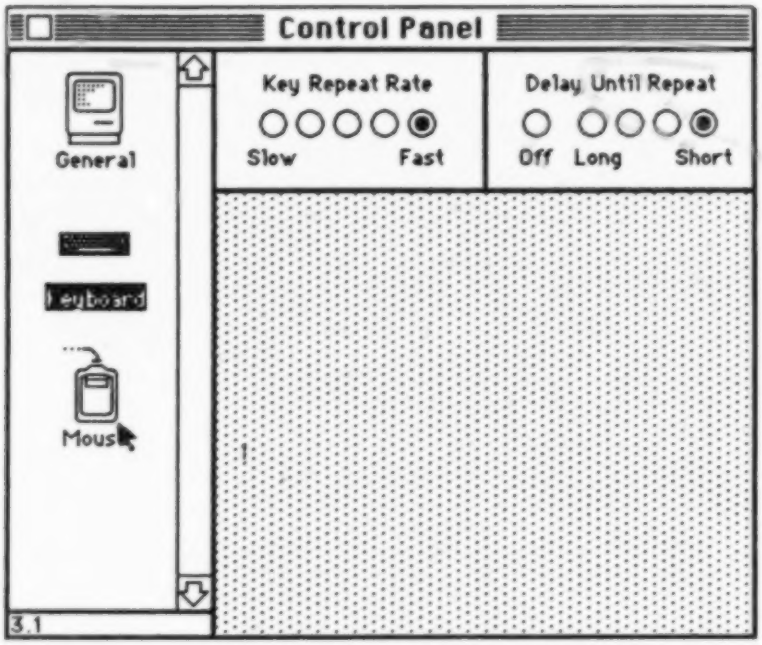
The following settings are good ones to use, but obviously not the only permissible ones. See pages 53-55 of *Macintosh Plus* for more information on the Control Panel.



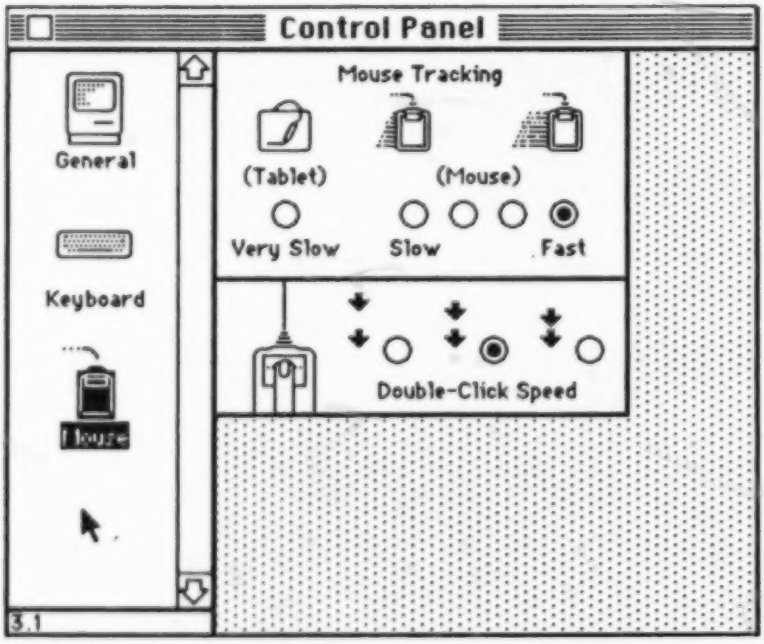
Notes: Keep the RAM Cache "on", and set at 128K. If the size of the RAM cache is set too large, the Mac may not operate properly. You can adjust the time and date from the control panel.

Changing the Desktop Pattern may confuse a learner since the screen will look different than examples in the book.

To get the display on the next page, click on the Keyboard icon.



To get the display below, click on the Mouse icon. Avoid the Very Slow setting for the mouse, or the mouse will be very sluggish in operation.

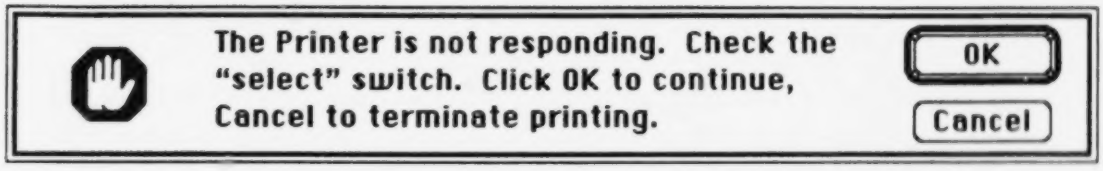


Methods for ejecting a disk from a disk drive:

1. select the disk and choose **Eject** from the **File** menu
2. drag the disk to the Trash
3. do ⌘-SHIFT-1 to eject a disk from the internal drive; ⌘-SHIFT-2 to eject one from the external drive.
4. **Restart** and **shutdown** from the **Special** menu will cause both disks to be ejected.

If a disk will still not come out, the last-ditch procedure is to insert a straightenend paper clip in the hole to the right of the disk drive slot, and push in hard till the disk pops out.

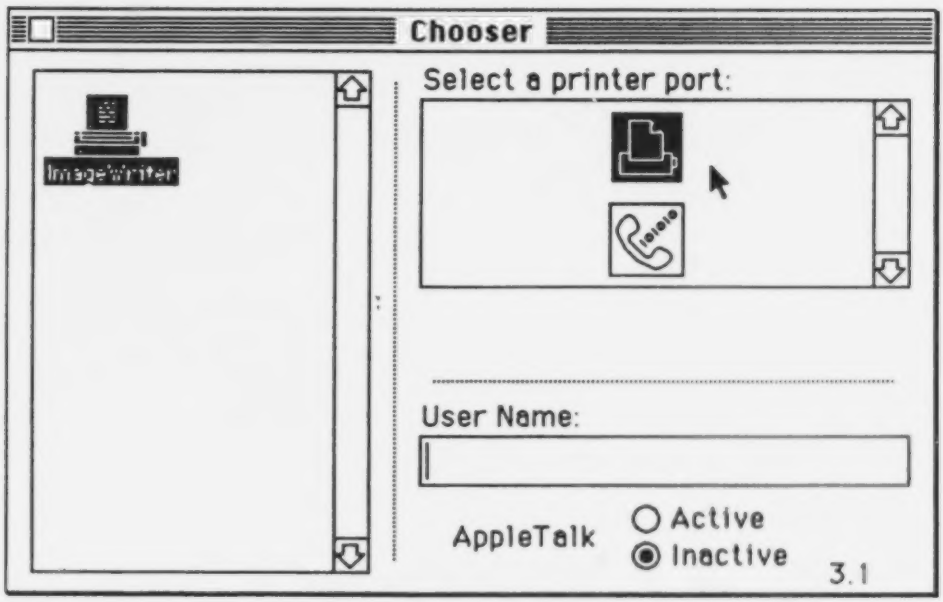
If the cause of the jamming was a label that came loose, secure it with scotch tape before re-inserting.



This message normally appears if the "Select" switch on the printer is not depressed. However, it may sometimes appear even when the select switch light is on.

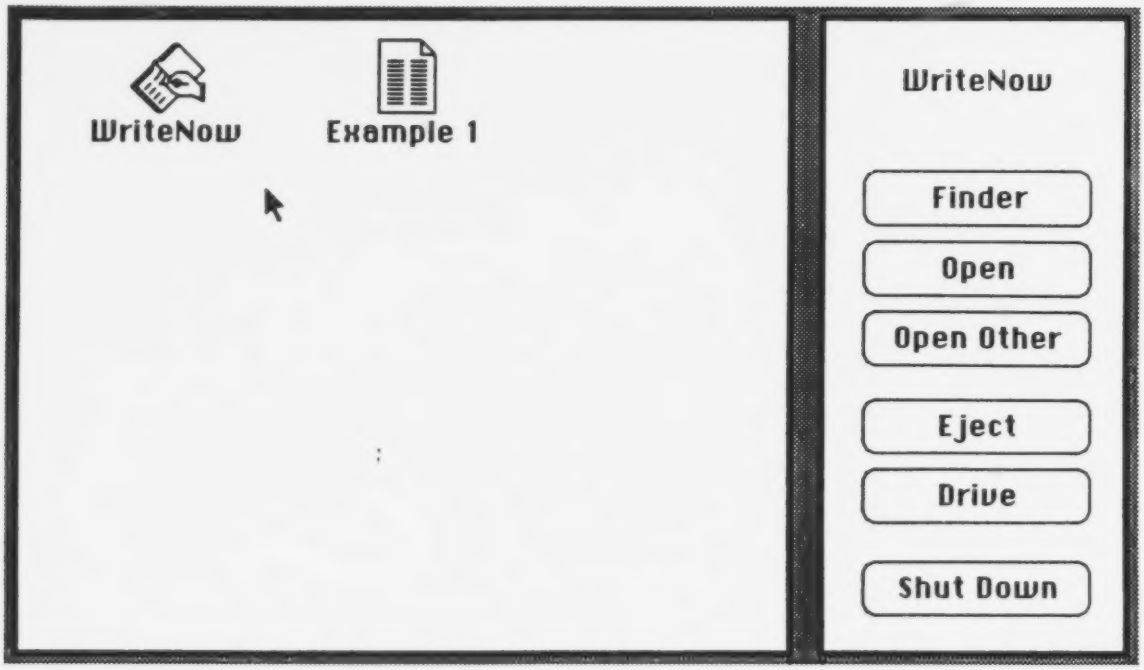
The cure is the same in both cases: depress the "Select" switch until the light comes on. Then click the OK button. If that doesn't achieve the desired result, look for a loose or disconnected printer cable.

If WriteNow seems to think that it's printing, but the printer isn't responding even though it's on and the select light is lit, check the **Chooser** under the menu. It should look like this:



You should click once on the ImageWriter icon to the left to select it if necessary, then click once on the printer icon to the right to select it, if necessary.

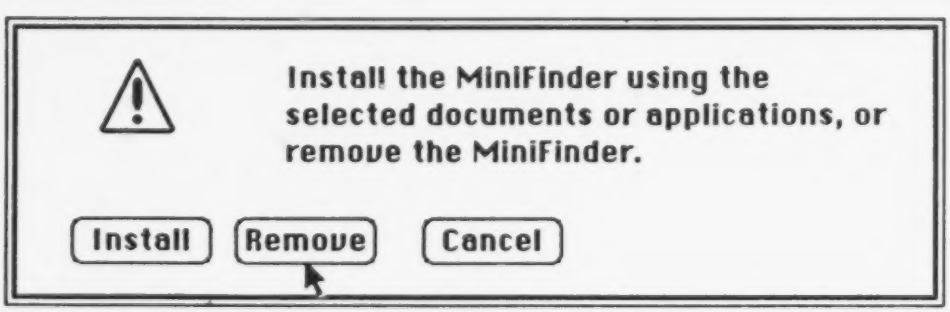
The AppleTalk button should be set to Inactive. Whether or not there is a User Name is irrelevant.



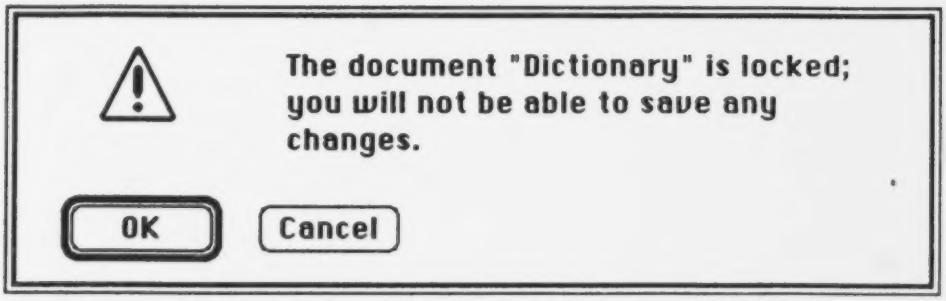
If you see a display like this (with, perhaps, different documents and programs, but with the same menu down the right side), someone has accidentally started up the Mini-finder. Although students have been asked not to experiment too freely with menu choices their instructional materials don't ask them to, sometimes it happens by mistake.

The cure is to click the Finder button in the menu to the right. You will be returned to the Finder.

Then choose **Use Mini-finder...** from the **Special** menu. The following window will appear:

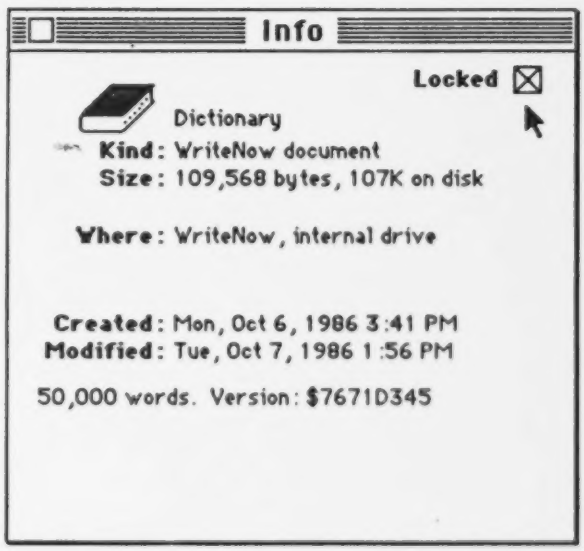


Click the **Remove** button. You should be returned to the Finder, and the problem will be solved.

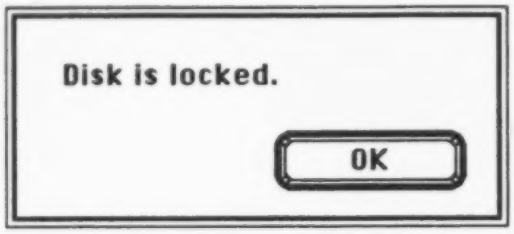


If you get a message that looks like this (although the document name, of course, may differ), it is probably because while exploring, some student accidentally "locked" the document. A locked document cannot be changed, then saved.

To "unlock" it again, choose **Get Info...** from the **File** menu while at the Finder, which produces a display like this:



Click the little "Locked" box (just above the arrow cursor in the example above); the X will disappear from the box. The document is now unlocked. Close the window as usual and proceed.



If this message appears when attempting to save or copy a document to a disk, the disk is probably locked. The cure: Move the plastic tab on the disk with a fingernail or ballpoint pen tip, so that you can see through the opening.

This message is to be expected when a brand new disk is inserted in a drive. You should initialize it as a Two-Sided disk.

If you get this message when using a disk that has already been initialized (and perhaps has documents on it), you should **not** initialize it. If you do initialize it, everything on that disk will be lost.

Rather, you should eject the disk, and manipulate the metal hub of the disk (visible on the underside of the disk) by jiggling it back and forth a few times, and perhaps rotating it a little bit. Use only your fingertips– no other object. Do not move the sliding protective flap to the side and attempt to handle the disk thus exposed.

Often, this manipulation will cause the message displayed above not to appear when the disk is re-inserted into the drive. If the message does appear, try the manipulation again. If half a dozen insertions and manipulations still result in the message appearing, there is probably nothing that can be done for the disk. It will have to be discarded, and all the information on it will be lost.

If the manipulation does result in the disappearance of the message, but it appears again at a later time, there is reason to suspect that the disk may be faulty. Rather than risk the student losing everything, issue the student a new disk, have him/her copy the files onto the new disk, and destroy the suspect disk.

Rarely, an error message appears saying (approximately) **A read error occurred** or **A write error occurred**. This generally indicates a physical defect on the disk. Typically, whatever was being read or written is not recoverable. If it was a write error, you should try to save the document to another disk. If it was a read error, you can try the same action again, but usually it's a lost cause: the disk is faulty and must be discarded. Reach for the backup or for the Kleenex (to cry into if you didn't have a backup).

The dreaded "System Bomb" which looks like this and generally comes with a message saying **System Error** and an ID number, means that the Mac has had a major nervous breakdown. The only cure is to turn the machine off and start again. Although system bombs are not common, they do occasionally happen, and they invariably seem to happen when you haven't saved your document recently, thereby causing you to lose all your work.

Reach for the backup or for the Kleenex (to cry into if you didn't have a backup).

If you get more than one system bomb, try to write out exactly what you did before the bomb (i.e., what menu you used, etc.), and contact the University for help.

When using the modem, if a NO CARRIER message appears on the screen and the keyboard appears inoperative, check the phone line. You should be able to hear a dial tone on the handset. If you cannot, hang up and try typing **ath** if possible.

If you hear a static-like rushing sound on the handset, disconnect the modem from the phone by unplugging one end of the connecting cord (either at the phone end or at the modem end). Re-insert the plug, making sure it is seated securely, and try again.

If several repetitions of the above procedure fail to clear the line, call Earl. If you cannot get him, call Sask Tel and ask them to check the number. Tell them about the rushing sound you hear instead of a dial tone. (If you tell them that you have a modem connected, they may leap to the conclusion that it is the modem's fault; perhaps it's best to neglect to mention *all* the details. After all, if you were trying to place a voice call on that phone, you would still be hearing that rushing sound instead of a dial tone, wouldn't you?)

The final, and most powerful, cure you should try for any problem you haven't been able to solve any other way, the "Grandma's chicken soup" of computing, is to turn off the machine and start all over again. (Remember to do it legitimately, by choosing **Restart** or **Shutdown** from the **Special** menu. If you cannot get back to the desktop, you may have to just flick the power switch to "off", but be prepared for the distinct possibility that you may lose some work in the process.)

Problems as different as rulers that aren't behaving the way they should; portions of the screen having strange contents, or lacking contents you know should be there; fonts not looking "right"; the screen breaking up into a wiggly pattern (perhaps with accompanying weird sounds), and many more can be cured with the flick of the switch. Note that the flick need not be done literally: using **Restart** has the same effect as using **Shutdown** and actually turning off the machine. (However, the latter may have a certain psychological benefit.)

Re-connecting a Printer, Modem, or Disk Drive

All equipment should be turned OFF before connections or disconnections are made.

At the left rear of the Mac there are two jacks (connectors), one with an icon of a printer, and one with an icon of a telephone handset. The printer should be connected to the jack with the printer icon, and the modem should be connected to the jack with the telephone icon.

The connectors can be inserted only one way (flat side of connector housing facing up); do not force the connectors.

The other end of the modem connector cable must be connected to the modem itself. There is only one place it can be connected; examine the arrangement of the pins to determine how the connectors mate. The telephone line must also be connected to the modem; either slot on the modem can be used.

The disk drive connection is more obvious in the sense that there is only one connector on the machine that matches the connector on the disk drive. Note that the connector is trapezoidal in shape, hence can be attached in only one way.

The mouse connection is similar in shape to the disk drive connection, but smaller. Once again, there is only one place, at the back of the Mac, where it can be attached.

The keyboard uses a telephone-jack type plug that should be inserted in the front of the Mac. Note that the connecting cord has the same type of plug on either end.

Do not attempt to use a regular telephone extension cord between the Mac and the keyboard or damage will result.

When you're done, check to see that the following connections exist:

- ❑ Printer to Mac
- ❑ Modem to Mac
- ❑ Disk Drive to Mac
- ❑ Modem to telephone
- ❑ Female end of fan power cord to Mac
- ❑ Printer to power outlet on fan
- ❑ Modem to power outlet on fan
- ❑ Fan to power outlet on wall
- ❑ Keyboard to Mac
- ❑ Mouse to Mac